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SHOCK*

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I.

THIS is the first of a series of articles on shock to appear in consecutive numbers of the *Journal*. A discussion with illustrative cases of the various forms of shock as outlined will appear in subsequent articles. General conclusions will be contained in the last article of the series. These are not review articles. Excellent reviews of the vast literature on the subject of shock are those of Blalock,[4] Harkins[10] and Wiggers[35] to mention only three of the more recent ones. The purpose of this series of articles is to present the problem in as practical a manner as possible with regard to diagnosis and treatment, in view of the importance of the subject of shock to both the military and the civil surgeon.

The material contained in these articles, except as otherwise noted, is based on a study of over eighty cases of burns, surgical shock, traumatic shock, hæmorrhagic shock and other forms of shock as seen in patients at the Royal Victoria Hospital in the past three years.

SYNOPSIS OF SERIES

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- A. Basis of classification adopted herein.
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- C. Hæmoconcentration vs. hæmodilution.
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- A. Surgical shock: (1) rôle of anæsthetic; (2) rôle of hæmorrhage; (3) rôle of dehydration.
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- C. Hæmorrhagic shock.
- D. Treatment with blood and blood substitutes.

IV. GENERAL CONCLUSIONS

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INTRODUCTION

The concept of shock has recently undergone certain changes. The syndrome of shock (low blood pressure, pallor, cyanosis, cold and clammy skin, subnormal temperature, etc.) of course has not changed, but our understanding of the mechanism of the development of shock has been modified by experiences gained in the investigation and treatment of shock since the present war began.[17]

The term "shock" has been used generally to include traumatic, surgical, post-hæmorrhagic, dehydration, burn shock, etc., without differentiating between them. Some types of shock differ from others as regards mechanism of development, diagnosis and treatment. The classification of shock into primary and secondary has no particular advantage, except perhaps in surgical shock, to be discussed later, and like the undifferentiated use of the term shock is confusing. A practical classification is one that is based not on time of appearance, but rather on conditions associated with or under which shock occurs, *e.g.*, traumatic shock, surgical shock, etc.

There is general agreement that the most constant feature of all types of shock is a reduction of blood volume. A reduced blood volume may result from a loss of any of the constituents of blood. In shock following hæmorrhage there is a reduction in blood volume due to loss of

whole blood; in shock following burns there is a reduction of blood volume due to loss of blood plasma; in shock following dehydration there is a reduction of blood volume due to a loss of water and crystalloids from the blood plasma. An increase in the capacity of the vascular system due to dilatation of some vascular segments without any actual blood loss, as occurs with stimulation of the carotid sinus, etc., would result in a reduction of effective blood volume.[34] Such a mechanism might account for certain cases of shock following anæsthesia and psychic or somatic trauma. Any combination or all of these causes of reduced blood volume may be present in certain cases but in general one factor is predominant in any given case.

Hæmoconcentration is not a constant finding in all types of clinical shock.[35] Hæmodilution is usually present in cases of traumatic shock and surgical shock in which there has been hæmorrhage. In post-hæmorrhagic shock hæmodilution is almost invariably present. This aspect of the problem of shock will be referred to again in more detail because of the confusion arising from the assumption of certain investigators that hæmoconcentration is a *sine qua non* of shock.[19, 20]

Another source of confusion surrounding the problem of shock may be attributed to certain interpretations of experimental investigations of the problem. The confusion arises from two sources: (1) the undifferentiated use of the term "shock" by experimentalists as well as clinicians, and (2) the assumption that the mechanism of development of experimental shock is also the mechanism of development of clinical shock. The most constant feature of experimental shock no matter how it is produced, is also a reduced blood volume. But shock may be produced experimentally by many different methods, and upon the method of production will depend whether the reduced blood volume is due to dilatation of vascular segments or to loss of whole blood, plasma or both and whether the loss is general or local. The undifferentiated use, *i.e.*, the use of the term shock without qualification or reference to the mode of production is therefore misleading. To assume that mechanisms present in experimental shock produced by toxic agents (histamine, tissue extracts, etc.) are also present in various types of clinical shock, because in both cases there is a reduced blood volume, is only to confuse the problem. When, furthermore, a concept of shock based on experiments without reference to the procedures that produce the circulatory collapse is used to explain the development of shock in the human being without reference to the conditions associated with its clinical occurrence, confusion is all the greater.

A few examples will illustrate the importance of the foregoing remarks in coming to an understanding of the problem of shock in general. Hæmorrhage causes a reduction in blood volume in any species. In the rabbit the restoration of the blood volume begins immediately as determined by hæmoglobin determination; *i.e.*, even during bleeding there is redilution of the blood;[31] in the human being, restoration of blood volume is less rapid and may not be appreciable until some hours after hæmorrhage;[7, 30, 31] in the dog, after hæmorrhage during barbiturate anæsthesia there is evidence of hæmoconcentration, presumably the effect of ejection into the blood stream of red blood cells from reserve stores such as the spleen.[9, 21] Consequently, depending on the species, the time elapsed between bleeding and blood sampling, anæsthetic, etc., post-hæmorrhagic shock may be characterized by hæmodilution, normal blood findings or hæmoconcentration.

In shock produced experimentally by the injection of toxic agents such as histamine there is a reduction in blood volume with hæmoconcentration due to loss of plasma from the capillaries throughout the body. A reduction in blood volume with hæmoconcentration due to the loss of plasma from the capillaries throughout the whole body is very rare clinically, except perhaps as a terminal phenomenon.

Finally, an analogy may be drawn between the use of the term "shock" and the use of the term "infection" without qualification. There is a clinical picture associated with infection, consisting of fever, flushed facies, sweating, increased pulse rate, etc. There is likewise a clinical picture associated with shock consisting of low blood pressure, pallor, subnormal temperature, etc. Just as the cause and specific treatment of the various forms of infection may be different so also may the cause and treatment of the various forms of shock be different.

For these reasons the different forms of shock will be considered separately according to the classification of shock adopted herein. The various types of shock and their distinguishing and common features discussed in this series of articles are those seen in human cases.

CONDITIONS ACCOMPANIED BY HÆMOCONCENTRATION

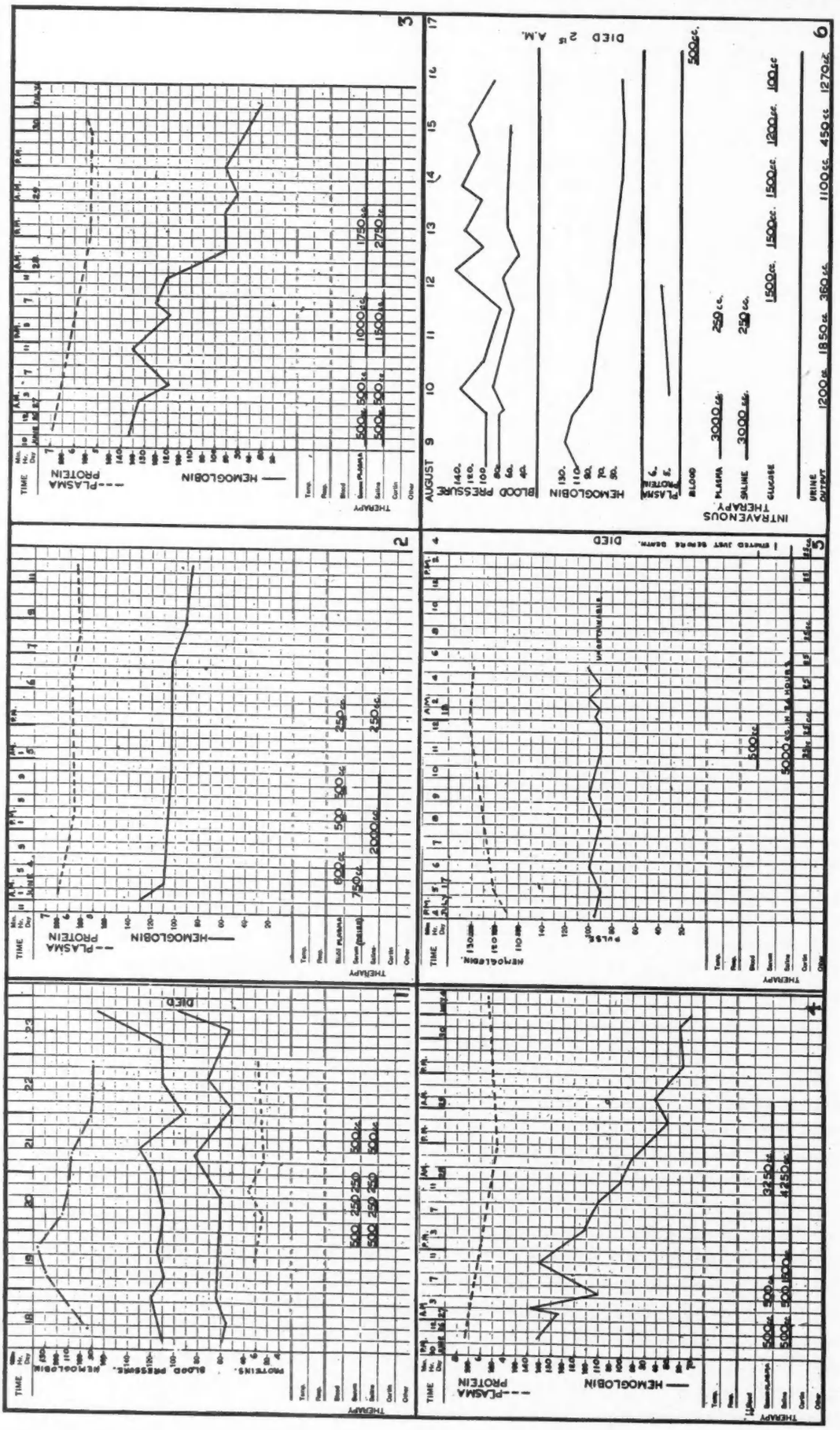
Burns.—Although severe burns may lead to shock, especially in untreated cases, it is extremely rare that even very severely burned patients show signs of shock when first admitted to hospital or at any time thereafter if properly treated.[25, 29, 37] The blood pressure as a rule is not much below normal and there is usually no pallor or cyanosis in the unburned area. This is not to say, however, that shock is rarely present in patients who have been burned over most of the body surface, or with severe burns who are not seen until many hours after injury, or who are inadequately treated, or who have sustained other injury such as a crushed limb, etc., along with the burn.

Hæmoconcentration is one of the most constant features of severe burns. The increased concentration of the blood that occurs in cases of burns is due to the local loss of plasma from both the surface of the burned area and also into the tissues beneath and adjacent to the burned areas as a result of the damaging effect of intense heat on tissues and their contained capillaries.[2, 11, 14, 28] It is very doubtful if there is any increase in the permeability of capillaries in areas distant from the burned parts. In moderate burns there is usually little loss of plasma and no hæmoconcentration. It is probable that the clinical classification of burns as to prognosis which is based on the extent of burned surface depends in large measure on the fact that the larger the surface burned, the greater the loss of plasma, reduction in blood volume, and hæmoconcentration.

In burns hæmoconcentration studies are invaluable because they enable one to determine the effectiveness of general therapy. Clinical impression not based on direct examination of the blood is misleading, since hæmoconcentration is usually in this condition unaccompanied in the early stages by outward manifestations of its damaging effects.[2, 8, 25] When as a result of continued hæmoconcentration symptoms finally appear they may be preagonal as shown by Case 1. The longer the marked hæmoconcentration persists with the markedly increased viscosity of the blood and reduction in blood volume, the greater probably is the tendency for pathological changes to occur in the capillary walls. It is unfortunate that the clinical condition of the patient at this critical early period often does not reflect the serious significance of persistent marked hæmoconcentration as demonstrated by Case 2, Fig. 1. It is very important that hæmoglobin determination (or other simple method of determination of hæmoconcentration such as hæmatocrit or erythrocyte count) be done repeatedly during the early period in cases of burns and that immediate plasma or serum transfusion be given rapidly and in amounts sufficient to reduce the blood concentration to normal, as shown by Cases 3, 4, and 5, Figs. 2, 3 and 4.

It is conceivable that the late complications of burns, for example, liver damage, kidney damage, ulcers in the gastro-intestinal tract, etc., which may appear a matter of several days after the burns, when perhaps the hæmoconcentration has disappeared, have their origin during the initial period of marked hæmoconcentration and plasma loss though they may not manifest themselves until days later. According to this view it is unnecessary to postulate a toxæmia in burns[4, 13] to account for the complications and fatalities that formerly, before the introduction of plasma or serum therapy, not uncommonly occurred. With three exceptions, none of the twenty cases studied at the Royal Victoria Hospital since the institution of early and adequate treatment with plasma have died and none have developed any of the complications other than infection of the burned areas. There were three patients, one with extensive burns and a traumatic amputation of the leg, another with extensive and deep burns with a crush injury, and a third with mild burns and chronic alcoholism, all of whom died. It is also possible that the early use of adequate amounts of plasma may influence the rate of tissue repair in burns in view of the important rôle attributed to the plasma proteins in the promotion of wound healing.[22]

Large amounts of plasma or serum are required for the treatment of severe burns.[3, 4, 11, 23, 27] As much as 4,000 c.c. of plasma may be necessary in the period of marked loss of plasma during the 48 to 72 hours after injury as shown in Cases 3, 4, and 5, Figs. 2, 3, and 4. The plasma should be given as soon and as rapidly as possible. It may be necessary in some cases of very extensive and severe burns to give plasma or serum into several different sites simultaneously to combat a rapidly developing hæmoconcentration, as in Cases 4 and 5. Plasma or serum is the ideal general treatment. Whole blood is not as satisfactory a form of therapy because of


3
HEMOGLOBIN
PLASMA PROTEIN
THERAPY
2
HEMOGLOBIN
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1
DIED
PROTEINS.
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HEMOGLOBIN
THERAPY
6
DIED 2ND A.M.
AUGUST
BLOOD PRESSURE
HEMOGLOBIN
PLASMA PROTEIN
BLOOD
PLASMA
SALINE
GLUCOSE
INTRAVENOUS THERAPY
URINE OUTPUT
5
DIED
HEMOGLOBIN
PULSE
THERAPY
4
HEMOGLOBIN
PLASMA PROTEIN
THERAPY

the already existing relative increase in the ratio of cells to plasma, with resultant increased viscosity of the blood, and because a transfusion of blood obviously contains only about half as much plasma as a transfusion of an equivalent amount of normal plasma or serum. Saline alone is ineffective as shown in Case 6, Fig. 5, because it is not merely loss of the electrolytes and water content of the plasma but loss of whole plasma (plasma electrolytes and water plus *proteins*) that must be replaced.[4, 11, 25] Intravenous saline in large amounts moreover, may be dangerous because of its tendency as a result of the decreased amount of total plasma protein in the circulation to pass out into the interstitial spaces including that of the lung, thereby causing lung œdema and pneumonia. Large amounts of water by mouth are also ineffective as shown in Case 2, Fig. 1.

The histamine findings in the cases of burns discussed herein in general confirm those reported by Rose and Browne.[25] The findings may be summarized as changes in the blood histamine level divisible into three stages: (1) an early increase; (2) a marked decrease during the period of œdema and plasma loss; (3) a return to normal or above normal as œdema subsides.[25, 32]

The questionable usefulness of adrenal cortical substances in the treatment of burns[23, 26, 36, 37] and in the prevention and treatment of the various forms of shock[12] will be discussed in a forthcoming article.[32] As shown in Case 6, Fig. 5, adrenal cortical extract had no beneficial effect, nor could it be expected to have had any such effect under the conditions in which it was used, *i.e.*, without plasma or serum. In Cases 4 and 5, Figs. 3 and 4, adrenal cortical extract was used together with adequate amounts of plasma so that any beneficial effect it might have had is impossible to evaluate.

Crush syndrome.—A condition in which shock is usually present accompanied by hæmoconcentration is the crush (compression, traumatic) syndrome. The hæmoconcentration is presumably due to a loss of plasma into the crushed area, usually a limb distal to a compression. One case, Case 7, of crush syndrome has been studied, and although it showed the typical findings reported by others[1, 6, 16, 24] as shown in Table I, it was complicated by very deep burns. This case will be reported elsewhere[5] in detail but it is included here because it demonstrates the complicated nature of traumatic injuries sustained even under civilian conditions and the blood findings after too much rather than too little intravenous therapy, as shown in Fig. 6.

CASE REPORTS

CASE 1

Female, aged 64. Admitted to hospital November 24th, within an hour after sustaining 1st and 2nd degree burns of the anterior surface of the arms, chest, abdomen and thighs; there were no signs of shock; blood pressure 130/80. Shortly after admission the patient was given avertin and gas, while tannic acid with 5 per cent solution of silver nitrate was applied.

November 25th: hgb. 127 per cent; plasma proteins 6.7 mg./100 c.c. November 27th: hgb. 121 per cent; plasma proteins 6.7 mg./100 c.c. November 29th: patient semi-comatose, 750 c.c. glucose saline intravenously. November 30th: coma deepened and patient appeared gravely ill.

The following notes were entered in the case report on November 30th: a blood sugar taken at 4 p.m. November 30th showed blood sugar to be 232 mg. per cent. Three catheterized specimens of urine obtained during the afternoon failed to show any sugar. CO_2 combining power was 44.6, non-protein nitrogen was 108. Urines were all of high specific gravity, showing that kidneys could still concentrate well. It was not felt that the patient had uræmia or diabetic coma. Toxicity did not seem likely because of (1) the superficial nature of the burns and (2) the nice eschar obtained which was absolutely free of infection. Although there were no neurological signs it was felt that the coma was due to an intracranial lesion (the patient was an epileptic) the exact nature of which was not quite evident.

The patient died at 10.30 p.m. November 30th. *Autopsy*: no frank pus was seen under the eschar. The visceral surfaces were dry. Thick venous blood exuded on section of the lungs which were of reddish black colour. There was congestion of liver, spleen and bowel as well as lungs. There were petechial hæmorrhages in the duodenum. The liver showed moderate fatty degeneration and the bone marrow showed a slight eosinophilia. No lesion in the brain was demonstrated.

It is possible that the signs of shock (blood pressure on admission 130/80; no further record of blood pressure) may have been the reason why intravenous therapy was not given. The marked hæmoconcentration with normal plasma protein levels indicated a considerable loss of whole plasma. There was evidence, both biochemical and morphological, of damage presumably the result of the continued marked hæmoconcentration.

CASE 2

Fig. 1. Male, aged 39, admitted to hospital one hour after sustaining severe burns about the face, neck, both hands and lower forearms. A blood sample was taken and the patient was sent to the operating room where the wounds were cleaned and saline dressings applied. No anæsthetic was used. His condition was considered good. On the following morning, although 2,700 c.c. of fluid had been taken by mouth, the hgb. had risen to 130 per cent. He was given an additional 1,500 c.c. of fluid by mouth during the day and at 11.00 p.m. the hgb. had risen even farther to 138 per cent. Despite the marked hæmoconcentration the patient seemed to be in good condition clinically, *i.e.*, as determined by inspection of his attitude, expression and colour. He was given plasma and

saline as shown in the chart, and although his blood volume was restored to normal as indicated by reduction of the hæmoconcentration, he died on the sixth day after injury. At autopsy there was found passive hyperæmia of the lungs, periportal hepatitis, arteriolar necrosis of the kidneys and focal capillary dilatation in the pons.

This case demonstrates the possible damaging effects of a persistent marked hæmoconcentration which had been allowed to develop, because, clinically, the patient seemed to be in good condition with a normal blood pressure and large fluid intake by mouth.

CASE 3

Fig. 2. Male, aged 55, admitted to hospital 18 hours after having received 1st and 2nd degree burns of the face, chest, abdomen, forearms, medial aspects of both thighs, and 1st, 2nd, and 3rd degree burns of both hands. On admission there was extreme swelling beneath all the burned areas, the blood pressure was 120/80 and the blood showed a concentration of 130 per cent. As shown in the figure he was immediately given 750 c.c. of lyophile serum reconstituted with normal saline followed by plasma and saline. During the first 20 hours following admission he was given a total of 2,350 c.c. of normal plasma and serum plus 2,000 c.c. of normal saline after which the hæmoconcentration was considerably reduced as shown by a hgb. of 100 per cent. It continued to decline as shown in Fig. 2.

The wounds were treated with saline dressings, the patient was given sulfathiazole grains 15, q.4.h. for the first several days and he was discharged cured 33 days after admission.

CASE 4

Fig. 3. Male, aged 40, admitted to hospital eight hours after having received 2nd and 3rd degree burns of both arms involving the entire surface from the finger tips to the shoulders, 2nd degree burns of the entire face and neck, 2nd and 3rd degree burns of about three-quarters of the back from the sacrum to the neck and including the axillæ. This patient was burned in the same explosion as the patient in Case 5. He was not in shock on admission. From the day of admission, June 26, 1941, until July 5, 1941, he received 10 c.c. of Connaught Laboratories cortical extract twice daily. The burns were treated with saline dressings with liquid paraffin on some areas.

On admission the hgb. was 136 per cent, plasma protein 6.97 per cent, indicating as in Case 5, Fig. 4, a marked loss of whole plasma. The patient was given 2,000 c.c. of a solution of plasma mixed with an equal volume of saline (the form in which plasma is stored at the Royal Victoria Hospital blood bank). The hæmoconcentration was controlled, but the blood began to concentrate again, so a continuous intravenous of plasma saline was begun. During the 50 hours following admission a total of 3,750 c.c. of normal plasma plus 5,250 c.c. of saline were given to control the hæmoconcentration. After skin-grafting the patient was discharged improved, three months from the time of admission.

CASE 5

Fig. 4. Male, aged 37, admitted to hospital eight hours after having sustained 2nd and 3rd degree burns of both arms involving the whole surface from the finger tips to the shoulders, entire face and neck, entire chest and abdomen from the level of the iliac crests to the shoulders and the back from the sacrum to the neck and including the axillæ. Although the patient was very severely burned, he was not in shock at time of admission. From the day of admission, June 26 until July 5, 1941, he received 10 c.c. of Connaught Laboratories cortical extract twice daily. The burns were treated with saline dressings and in some areas liquid paraffin was used.

On admission the hgb. was 137 per cent, plasma proteins, 7.38 per cent, indicating marked loss of whole plasma. Patient was given 1,000 c.c. of a solution of plasma mixed with an equal volume of normal saline. The hæmoconcentration was controlled, but the blood began to concentrate again (140 per cent) and 1,000 c.c. of plasma saline solution were given rapidly after which the hgb. was 110 per cent. Continuous saline of 1,500 c.c. was then begun but the ineffectiveness of the saline was shown by the hæmoconcentration of 134 per cent 12 hours after admission. From then on a continuous intravenous of plasma saline solution was given, during which time frequent hgb. determinations were made as a check on the effectiveness of the therapy. During the day of June 27th it was necessary to give the plasma-saline into several different sites simultaneously, to control the hæmoconcentration. During the 50 hours following admission, patient received 4,250 c.c. of normal plasma plus 6,750 c.c. of normal saline, in addition to which he took liquid freely by mouth.

This case, as well as Cases 3 and 4, Figs. 2 and 3, illustrates (1) the importance of frequent determination of hæmoconcentration in severe burns; (2) the large amounts of plasma necessary to treat severe burns effectively; (3) the need of a readily available supply of plasma or serum.

CASE 6

Fig. 5. Female, aged 45, admitted to hospital one hour after sustaining 1st and 2nd degree burns over 80 per cent of the body surface. Although no blood pressure readings were obtained because of the burns over both arms and legs, it was evident that she was in severe shock. Because of the collapsed state of of the circulation it was necessary to cut down on a vein for intravenous treatment. Tannic acid spray was immediately applied to the entire body except the face.

It is probable that the shock present in this patient on admission was due to the rapid loss of plasma due to the involvement of so much of the body surface. The rapid loss of plasma is shown by a hgb. of 115 per cent on admission. It is likely that hæmoconcentration was even as great as 25 per cent if the preburn hgb. level is taken as 90 per cent (the hgb. level of the average healthy woman). No plasma was available at the time the patient was admitted. She was therefore given saline, which even in excessive amounts was ineffective in reducing the hæmoconcentration which reached 132 per cent. Adrenal cortical extract (Wilson's)* was given in large amounts, 200 c.c. in the 24 hours between admission and death.

CASE 7

Fig. 6, Table I. Male, aged 48. The patient was admitted one hour after having sustained injuries in a train wreck. He was in a stuporous condition at time of admission; there were 3rd and 4th degree burns of the head, face, neck, right arm and right leg; the left shoulder was swollen and ecchymotic. The blood pressure, hgb., intravenous therapy and urinary output are shown in Fig. 6. The blood chemical findings are shown in Table I.

* The adrenal cortical extract was supplied through the courtesy of Dr. David Klein of the Wilson Laboratory.

TABLE I.

Date 9	10	11	12	13	14	15	16
Creatinine mg.%						7.6	9
Non-protein nitrogen "	72		174	330	255	244	326
Sugar "	162						
Serum NA "					328		
Serum K "					28		
Chlorides "						348	335
CO_2 capacity vol. %					37	45	26

From the time of admission until death 7 days later the patient did not regain consciousness. The burned areas were immediately treated with saline dressings but by the 2nd day the burns showed signs of infection. At this time the burns were seen to be deeper than at first suspected, for in certain regions the muscles and tendons and even bone were exposed. During the first 24 hours after admission he was given sulfathiazole grains 30 as an initial dose and grains 15 q.4.h. until oliguria was detected. The sulfathiazole was then discontinued.

The swelling of the patient's left shoulder increased tremendously in size so that the joint lost all form. It is on the basis of this finding as well as the development of oliguria and uræmia and increase in serum potassium (see Table I) that the crush syndrome was considered to be present in this case.

At autopsy the kidneys showed a slight degree of hæmatin precipitation in the tubules and an occasional hgb. cast. The kidneys, liver, spleen and gastro-intestinal tract were hyperæmic. There was marked œdema of the lungs.

The cause of death is unexplained. The uræmia may be considered as due to the crush and the burns since it occurs in both conditions. The nature of the factors responsible for the renal failure is unknown. The decrease in hgb. by approximately 50 per cent may possibly be explained as a result of an increase in blood volume following the infusion of approximately 7,000 c.c. of plasma and saline and concurrent oliguria.

CONCLUSION (PART I)

The frequent determination of hæmoconcentration is necessary for the proper evaluation of the seriousness of the condition of the patient with burns. Plasma or serum is the ideal general treatment. The plasma should be given early and in adequate amounts, neither too little nor too much. The blood findings with respect to hæmoconcentration are the best guide to the proper amount of plasma or serum to be given. Because of the plasma requirements of the severely burned patient, the successful treatment of such patients, especially in industrial communities where casualties may be expected to occur as a result of accidents in industries connected with the war effort in Canada, will depend on the immediate availability of a sufficient supply of plasma or serum. The blood bank is one of the services of a modern hospital by which such a supply may be assured.

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A "Kicker" writes.—How worried I am about my breakfast cereal! Formerly, I would choose a product of wheat or oats or corn, feeling that what would fatten a hog or strengthen a horse was good for me. Now I find that Cereal A is especially made for children who play hard, Cereal B is for nursing mothers and Cereal C is what makes champions.

I am not a child, a nursing mother or an invalid, and I think it smacks of too much of vulgar professionalism to be a champion.

I have just bought a pound of rice and am looking for old-fashioned oatmeal in bulk and will hope to find some packaged cereal free from thiamin or vitamin B or tin whistles and silverware. KICKER

ROENTGENOGRAPHIC VISUALIZATION OF THE PLACENTA, UTILIZING THE PLASTIC FILTER*

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THE localization of the placental site by means of roentgenological methods has been attempted primarily to forestall the necessity of vaginal examination of the pregnant woman who has vaginal bleeding during the last trimester. Clinical investigation, aside from vaginal examination, has been of little use in this respect. The need for such circumvention is apparent to every obstetrician, as the dangers from digital examination are obvious.

The search for localizing signs began with Kegaradic more than 100 years ago, when he described the uterine souffle as of value in determining the site of the placenta. Unfortunately, this has proved to be of no clinical importance. The first efforts to visualize the placenta by radiographic means were those of Erhardt and Katsuya in 1932. Their procedure was to inject thorium dioxide solution intravenously into animals. This substance being radiopaque remains in the maternal blood sinuses of the placenta for several hours, and thus will throw a shadow on the x-ray film.

Shute and Davis[1] after exhaustive studies reported thorium to be extremely toxic; to have a narrow margin of safety, and to tend toward the induction of labour. It may produce permanent sterility, and has numerous other disadvantages. It is also pointed out by Schmidt that thorium is a radioactive substance, and further x-ray examination of these patients is fraught with danger.

In the same year, 1932, Campbell, Miller, Menees and Holly[2] described a method of amniography. These investigators injected an aqueous solution of strontium iodide into the amniotic cavity. They used a lumbar puncture needle inserted through the anterior abdominal and uterine walls. The opaque medium which was in the uterine cavity cast a shadow on the x-ray film; the placenta was visualized as a filling defect. One danger of this method was the blind insertion of a needle through the abdominal and uterine walls with the possibility of trauma to fetus, placenta, or umbilical cord. Burke,[3] utilizing this method, found that the intrauterine injection of uroselectan brought on labour so consistently that he intentionally used it to induce labour in 27 cases, with only one failure.

In 1934 and 1935, Ude, Weum, Urner[6] and later Robbins[7] in 1938, introduced a method of diagnosing placenta prævia by indirect placentography, making use of an opaque cystogram. The emptied urinary bladder was injected with 40 c.c. of 12½ per cent sodium iodide. The normal distance between the lower border of the presenting fetal head and the postero-superior border of bladder is approximately 1 cm. Should placenta or other soft tissue be lying between fetal head and bladder, the intervening space will be widened. Some experience with this method has shown it to be of limited use in diagnosis. Our experience has been borne out by the work of Beck and Light,[8] who report that in their series of 90 bleeding cases, 21 per cent were of no avail because the presenting part was other than vertex. Of 17 cases of placenta prævia, the diagnosis was incorrect in 23.5 per cent. It has also been shown that an apparently normal cysto-placentogram may be obtained, when the placenta is attached to the posterior wall of the lower uterine segment.

In 1934, Snow and Powell[4] reviewed a number of routine lateral radiographs of the abdomen, and were able to visualize the placenta in a high percentage of cases. Snow and Rosensohn[11] utilized the soft tissue technique described by Carty[9] in 1936 and reported further results of their work in 1939. They used lateral radiographs, supplemented in some cases by an air cystogram. Their conclusions were:

(1) The most frequent placental site is at or near the fundus. (2) The placenta occupies about one-third of the wall space of the uterus. (3) It bulges in the centre, and tapers at the periphery toward the uterine wall. (4) In practically all cases, the ventral surface of the fetus faces it. (5) Normal amounts of amniotic fluid do not show an opaque shadow on a radiograph. Polyhydramnios can interfere with the roentgen visualization of placenta. (6) The thin dark line around the

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fetus is due to the subcutaneous fetal fat. (7) Central placenta prævia is diagnosed by being unable to see the placenta elsewhere on the uterine wall. (8) Premature separation of the placenta may be diagnosed by soft tissue radiography. The picture is characterized by a localized bulge in the uterine wall.

In 1938, Torpin,[12] of the University of Georgia, described, "A New Method of Studying Placentation by Amniotic Sac Distension" following delivery. His findings have been of considerable help in evaluating the various shadows in the study of soft tissue placentograms. He states that most placentæ lie between the cornua of the uterus and are more or less circular, lying on the relatively flat anterior or posterior wall. He found that the placenta seldom extended over the dividing line between the anterior and posterior walls, laterally, or over the apex of the fundus and that it occupied from one-quarter to one-third of the uterine wall.

In 1940 Dippel and Brown[14] of Johns Hopkins University, published several excellent articles containing a most intensive study of placentography by the soft tissue radiographic method of Snow and Rosensohn. These investigators were able to recognize the placental shadows in 90 per cent of 262 cases. Their results in brief demonstrated that the placenta was located in 103 cases on the posterior wall of the fundus of the uterus, and in 107 cases on the anterior wall. It was located on the posterior lower uterine wall in 3, and on the anterior lower uterine wall in 23 cases. There were 26 patients in whom the placenta was not visualized.

Of 92 bleeding cases only 11 proved to be central placenta prævia by placentograms, while 15 cases which were symptomless showed low placental implantation. Retroplacental hæmorrhage of the normally implanted placenta could not be differentiated from the normally attached placenta. The placenta could not be visualized in cases of hydramnios and only occasionally in cases of multiple pregnancy. They disagree with Snow that the fetal position is a reliable criterion as to the site of the placenta. Our own results bear out this contention. They were able to check their results in 53 cases by Cæsarean section or vaginal examination. In all cases the x-ray diagnosis of placental site was substantiated. They were unable to visualize both posterior and anterior uterine walls on the same film without special methods of illumination. Poor films accounted for non-visualization of the placenta in 8 cases. Their work was done with lateral soft tissue radiographs occasionally utilizing an air cystogram.

Our interest in this procedure began in September, 1940, when Snow's work was observed at the meeting of the American Roentgen Ray Society in Boston, by one of us (C.E.V.). Kruger and Armstrong at the Toronto Western Hospital had been trying out the method with considerable success. It was decided to confine our investigations to the private patients of two of us (R.T.W. and D.L.A.) until we were convinced of the reliability of this procedure. This enabled a careful comparison of radiological observations, with accurate and consistent evaluation of prenatal and delivery findings.

Our first few cases proved to us that by utilizing less penetration than our customary technique in lateral radiographs and by underdevelopment, we could obtain a visualization of the soft tissues within the abdominal cavity, above the level of the iliac crest. Confirmation of these findings has been carried out in the following manner.

In most of the elective Cæsarean sections, radiographic visualization of the placenta has been done. The radiologist has observed the radiographs, and made a written report. One obstetrician whose case was being examined observed the films with the radiologist, and added clinical data which were of additional help in arriving at the diagnosis. The second obstetrician did not view the films nor see the report. At operation, he was required to state the exact location of the placenta *in utero*, from his examination.

Our first patient was a case of marginal placenta prævia which was diagnosed radiographically, and confirmed by vaginal examination on delivery. In another early case diagnosed clinically as accidental hæmorrhage (Fig. 1), an extreme degree of calcification of the placenta was encountered, and a radiographic diagnosis of partial separation of the upper pole was made. This was confirmed following delivery. We do not wish to suggest that all cases of accidental hæmorrhage can be demonstrated by this method. The only case of central placenta prævia in our series was also diagnosed by soft tissue radiographs, and was verified at Cæsarean section.

A study of early radiographs showed that this technique in our hands produced a film of poorer technical quality than our usual standard of radiographic work. A film which showed the

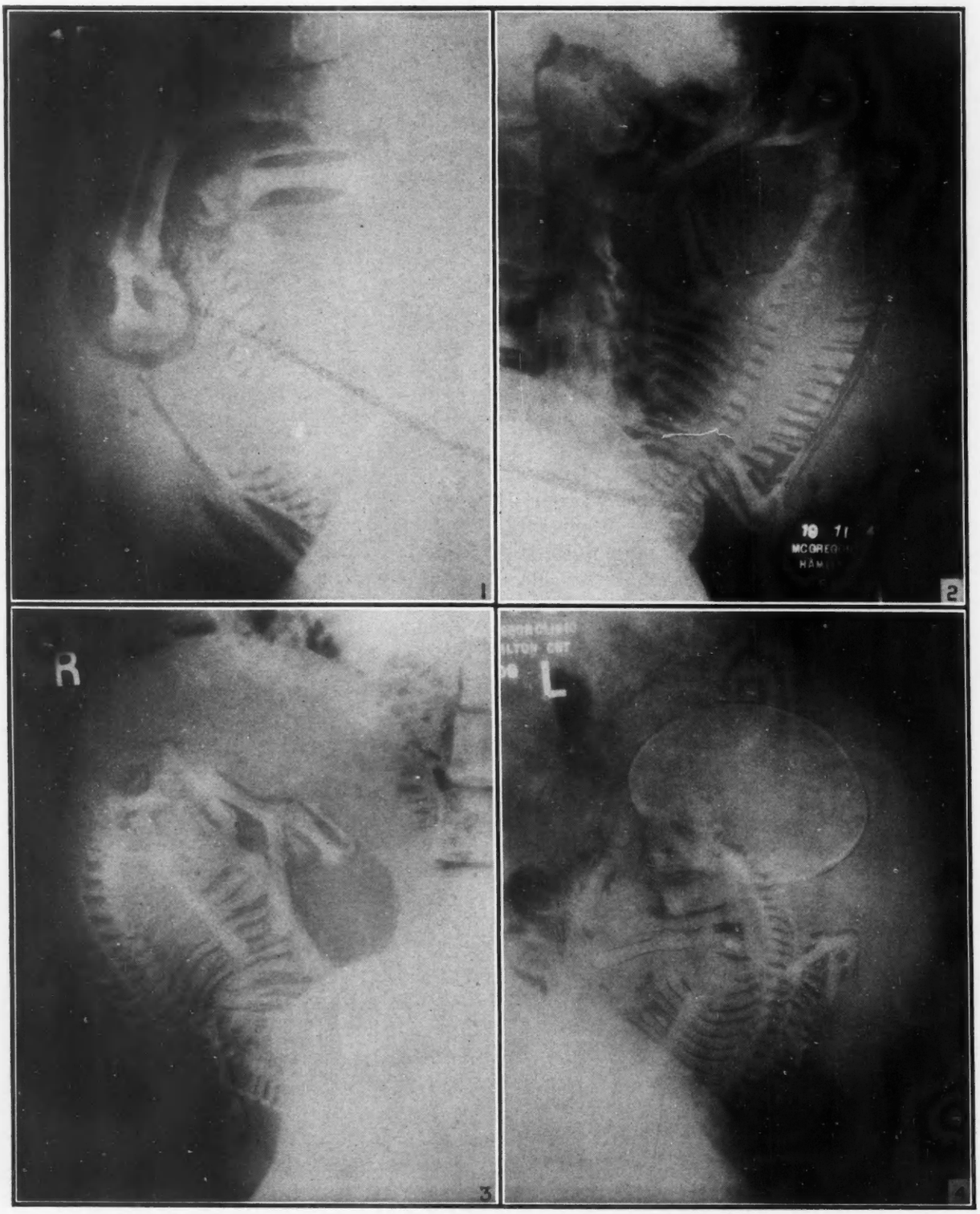

Fig. 1.—Accidental hæmorrhage with calcification through the placenta and separation of the upper pole. Verified at delivery. This radiograph was made without filter. Note the under penetration of the posterior wall. **Fig. 2.**—Normal cephalic presentation. Placenta located on the anterior uterine wall. Taken with filter. **Fig. 3.**—Normal cephalic presentation. Placenta located posterior wall of the fundus of the uterus. **Fig. 4.**—Breech presentation. The placenta visualized on anterior uterine wall. Normal implantation.

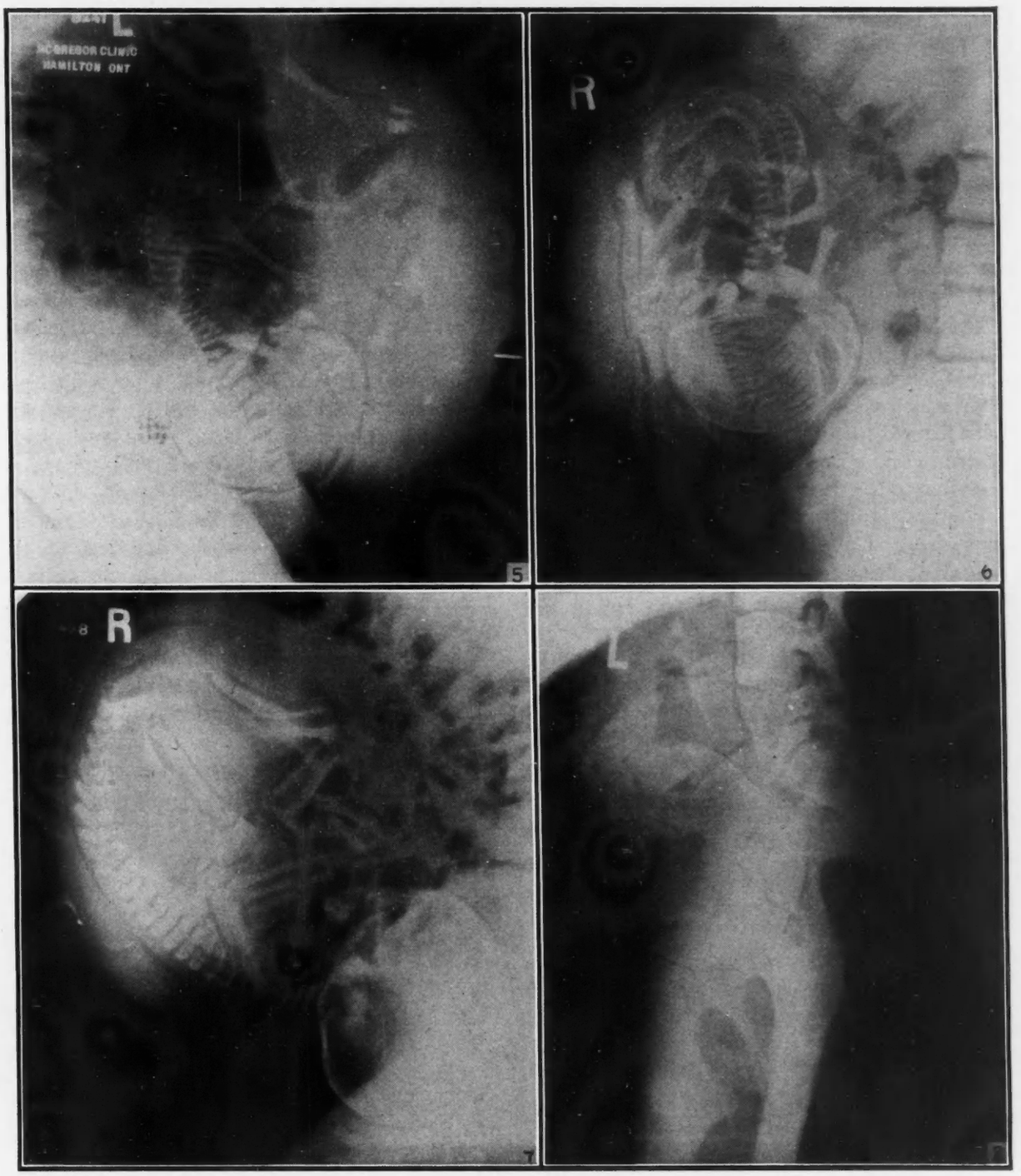

Fig. 5.—Uniovular pregnancy. Large single placenta located on anterior uterine wall. Stylet marking position of umbilicus. Verified at delivery. **Fig. 6.**—Binovular pregnancy. One placenta located on anterior uterine wall. Second placenta located on posterior uterine wall. Verified at delivery. **Fig. 7.**—Cephalic presentation. Bipartite placenta. One portion of the placenta on the posterior wall of fundus of the uterus. The second portion of placenta on anterior uterine wall. Verified at Cæsarean section. **Fig. 8.**—Radiograph made with plastic filter showing lower posterior uterine segment and sacro-sciatic notch.

anterior wall of the uterus satisfactorily, frequently lacked sufficient detail in the remainder of the film. In several instances in which the placenta was not visualized on the anterior uterine wall, the patient was re-examined and the exposure increased so as to penetrate the region of the spine. In these cases the placenta was visualized on the posterior wall, but the heavy penetration had completely obliterated the anterior uterine shadow.

It was apparent that we were faced with the technical difficulties enumerated by previous workers.

Obviously, the first requisite was a film of nearly uniform density throughout. Mrs. Mary Cameron, chief technician at the McGregor Clinic conceived the idea of fashioning a plastic filter which would cut out a certain amount of radiation to the anterior portion of the abdomen, at the same time permitting heavier radiation to the posterior uterine wall and spine.

The first filter was made with opaque plastic on a sheet of aluminum, ½ mm. in thickness (Fig. 9). The outer margin of the plastic was approximately 2 mm. in thickness, and it was graded off to the centre of the filter. The portion of the filter covering the posterior uterine wall and the spine, had no opaque plastic material on it. An immediate improvement in the radiographs was observed. Both anterior and posterior uterine walls could be readily visualized on the one film. The films were of almost uniform density, and were of reasonably good radiographic quality. Furthermore, they could be developed by time and temperature methods. The placentæ, if located on the anterior uterine wall, were much easier to distinguish than heretofore.

Shortly afterwards, both right and left lateral radiographs were made, and this has further facilitated the diagnosis. It was still impossible to adequately visualize the lower uterine segment behind the iliac crests. Another plastic filter was fashioned in which the opaque plastic extended from the outer margin, where it was 2 mm. in thickness, back to the posterior part of the filter, where it was shaded off into the aluminum. The portion of the filter, which was to cover the region of the iliac crests and the sacro-sciatic notch was left free of any plastic material (Fig. 10). This has greatly improved our radiographs. We believe that this will enable us to visualize soft tissue shadows in this area, as well as improving the view of the sciatic notch. Up to the present time, we have not had a case of low implantation on the posterior wall.

Success in the roentgenographic visualization of placenta lies in extreme attention to detail in all parts of the investigation.

In the laboratory at the McGregor Clinic, these examinations are carried out only by ap-

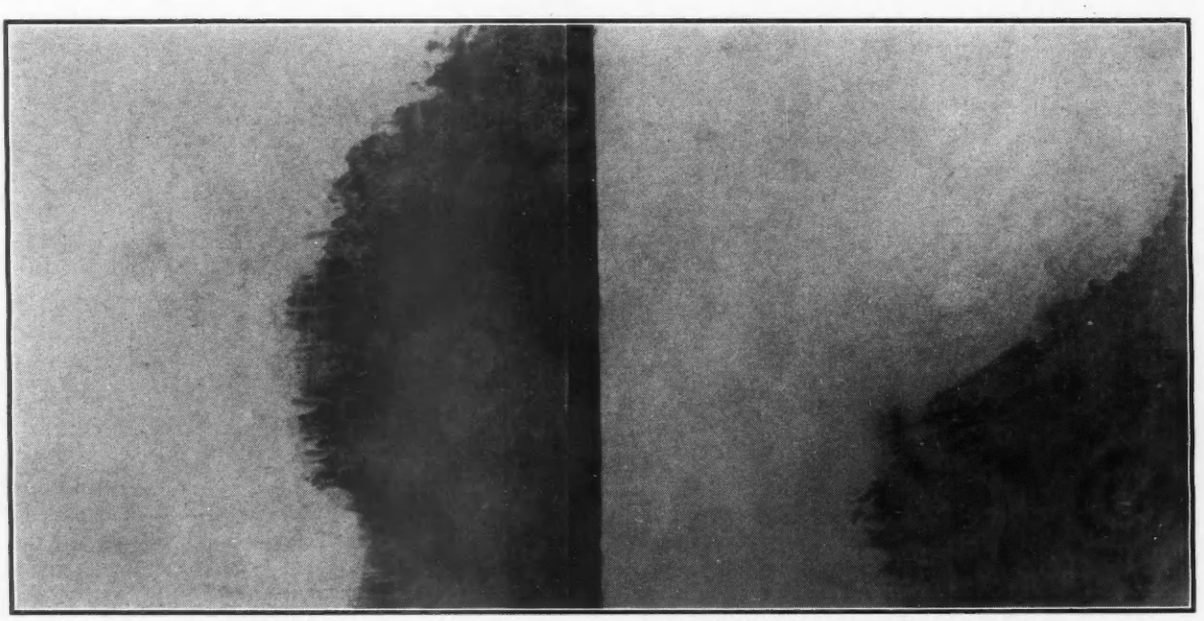

Fig. 9 Fig. 10

Fig. 9.—Photograph of the first plastic filter. The portion of the filter over the lumbar spine is free of any opaque plastic material. **Fig. 10.**—Photograph of plastic filter now in use. The portion of the filter which covers the region of the iliac crests and the sacro-sciatic notch is free of any plastic material.

pointment. As soon as the patient enters the building, she is taken immediately to a dressing-room in the x-ray department. The patient is instructed by a female technician to remove all her clothing with the exception of shoes and stockings, and is given a clean cotton gown, and woollen dressing gown. Meanwhile, the radiographic room is prepared. The cassette is placed in the Bucky tray, the identification numbers are attached, and the plastic filter is set in the tube carriage so that the thickest layer of opaque plastic will be over the abdomen. The area of the filter free of any material is placed over the region of the sciatic notch. The table top is bare of any covering.

The patient is placed on the table in the lateral position, and all covering, including the cotton gown is removed from the abdomen. The exposure factors are: 36″ target film distance; 78 to 85 K.V.P.: 100 mps.; 2½ to 4 seconds. The patient is asked to suspend respiration during the exposure. This is contrary to common practice in this work, but we have found very little difficulty with movement of the fetus. A small pillow between the knees, and a compression band placed low down on the thighs to steady the patient are used.

The patient is then placed in the other lateral position, the filter turned around in the tube carriage and a second exposure made. The tube is next centred over the sciatic notch, and with the plastic filter in place, exposure is made for this region of the pelvis. A single antero-posterior film completes the radiographic examination. Once the proper exposure factors have been determined by experience, the films can be satisfactorily developed by time and temperature method. By the usual roentgenographic method without the use of filter, we found it necessary to develop films by sight, and this is a very unsatisfactory procedure in a busy department.

The use of an opaque plastic filter with right and left lateral radiographs enables us to visualize the whole of the uterine cavity. It has been frequently noted that the placenta is much better shown on one of the lateral views. This is presumably due to the fact that the greater portion of the placenta is located towards the side closer to the film, and that the detail is therefore better. The examination takes no longer and requires no more fuss than a routine examination of the lumbar spine. It has not been found necessary up to the present, to introduce any air into the bladder. We feel that this is a very undesirable procedure, particularly in a private x-ray laboratory, where patients are referred for examination. Coming into a group of strange individuals they resent any instrumentation. In working out this method, it has been our constant effort to obviate the necessity for a cystogram in diagnosis. Most of the cases have been examined in the latter months of pregnancy, and if we are permitted to choose the optimum time 8½ months gestation is recommended.

The making of the plastic filter presents some difficulty. By fluoroscoping the filter it is possible to get a fairly even distribution of the opaque plastic and relative densities of the various areas can be determined. We are at the present time working on a metal filter which can be produced commercially.

Measurements of roentgen dosage with a Victoreen meter show that the skin dose on each lateral projection is approximately 10 roentgens. The flat antero-posterior film of the abdomen, using the usual technical factors, gives a skin dose of 5 roentgens.

Uterine bleeding in the third trimester of pregnancy has always been a very alarming symptom to the obstetrician. The high mortality rate for both mother and child of any method of vaginal delivery in central placenta prævia has markedly increased the number of Cæsarean sections performed for hæmorrhage during the latter months of gestation. Unfortunately Cæsarean section is still the most dangerous of the commonly performed operations. Many women have been subjected to this serious procedure, when at operation it was found that delivery from below could have been done more safely because the placenta was in a normal location, or not sufficiently across the internal os of the cervix to cause much difficulty.

The findings of Dippel and Brown previously mentioned, in patients bleeding in the last trimester, are particularly enlightening, namely that of 92 bleeding cases, only 11 were placenta prævias.

This fact demonstrates the importance of x-ray investigation, as the remainder of these cases could, in all likelihood, be carried safely to a successful normal termination of their pregnancy without the risk attending vaginal examination.

In order to avoid unnecessary Cæsarean sections in suspected placenta prævia, most obstetricians have the patient and the operating room prepared for either abdominal or vaginal delivery before doing an examination. In patients with a central placenta prævia even a gentle vaginal examination may cause profuse bleeding and increases the risk of post-operative infection. Any method of investigation which may eliminate such dangers is worthy of note.

In true placenta prævia, there is often a slight bloody discharge some time before a massive hæmorrhage occurs. An x-ray demonstration of the placental site before serious bleeding has occurred would permit pre-operative precautions, greatly decreasing the danger to both mother and child.

For the proper care of a gravid woman with bleeding, we must know accurately the location of the placenta. The importance of this fact has stimulated the research work already mentioned, with the result that a safe and reliable method of demonstrating placental implantation is now available to the obstetrician.

Since this is a preliminary report, the full clinical value of roentgenographic visualization of the placenta is yet to be determined. In a great many x-ray investigations of obstetrical patients the placental localization may be only an incidental finding, and not directly related to the reason for the radiological study. We wish to point out, however, that the improved technique may add information of very real clinical value in many obstetrical problems by coincidentally visualizing the placenta.

In elective Cæsarean section, for example, the pre-operative location of the placenta may influence the type of operation performed. In cases of previous abdominal delivery, a placenta located away from the operative site may make the surgeon feel more justified in permitting a trial labour. On the other hand, should the placenta be located lying over the site of the old incision, one realizes that the chance of a ruptured uterus is greatly increased, should labour be permitted to continue.

In these days of sudden change of domicile due to military or industrial transfer, the obstetrician is frequently asked by the pregnant woman about the safety of such a move. A placenta prævia without clinical evidence might be a catastrophe in such a case. Although the optimum time for this investigation is 8½ months, we have been able to demonstrate the site of the placenta in certain cases considerably earlier.

Fetal mortality in breech deliveries, especially in primiparæ, is so high that any procedure likely to decrease it must be strongly recommended. Roentgenological examination of a suspected breech presentation may aid in external version, before the onset of labour, and may be of value during labour by giving the physician an exact knowledge of the lie of the fetus. The difficulties of an external version will be considerably increased by extended legs, and by a placenta lying on the anterior wall of the uterus. Obviously, an attempted external version with an unsuspected placenta prævia might be extremely serious.

In suspected multiple pregnancy, an x-ray is frequently done to confirm the physician's opinion, and to demonstrate his diagnosis to the patient. In our series of cases of twin pregnancies, we have been fortunate in demonstrating the placentæ in cases of uniovular pregnancies, and in cases of binovular pregnancies. These have all been confirmed on delivery. These results are of real clinical importance, because the chance of survival of the second baby is greatly increased in uniovular pregnancies, by the prompt delivery of the second baby.

When starting this investigation on private patients, it was decided to limit our study to those cases in which accurate clinical confirmation of the radiological diagnosis might be obtained. These included elective Cæsarean sections and certain patients in whom intra-uterine manipulation would be justified on conservative obstetrical grounds. This gave the opportunity for palpation of the placenta *in situ*. No effort was made to do routine roentgen examinations.

A tabulation of results of examination in 52 cases shows:

1. The placenta was located on the anterior uterine wall in 26 cases, and the posterior uterine wall in 17 cases.
2. There were 3 cases of marginal placenta prævia, all on the lower anterior uterine wall.
3. There was 1 central placenta prævia.
4. There were 5 cases of breech presentation and placenta was located in all.
5. There were 5 sets of twins, 3 uniovular and 2 biovular, in which the placentæ were all visualized.

CONCLUSIONS

1. This method has greatly improved the radiographic qualities of soft tissue films for the visualization of placenta.

2. Time and temperature development can be used.

3. The whole uterine wall can be visualized.

4. Right and left lateral radiographs facilitate placental localization.

5. Visualization of placenta in cases of excessive obesity, multiple pregnancy, breech presentation has thus far presented no difficulty.

SUMMARY

1. An improved method of roentgen visualization of placenta utilizing a plastic filter is described.

2. This is a preliminary report of 52 consecutive cases. The placenta was visualized in every case.

3. The value of accurate placental localization in late pregnancy bleedings has been stressed.

4. The possible importance of incidental placental visualization in various obstetrical problems has been mentioned.

We are indebted to Mrs. Mary Cameron, Chief Technician of the Department of Radiology, of the McGregor Clinic, for her efforts in developing the plastic filter, and her never-failing enthusiasm, constantly exemplified throughout this work.

DISCUSSION

DR. GORDON E. RICHARDS.—Dr. Vaughan and Mrs. Cameron are to be congratulated on this important contribution toward the better roentgen visualization of the placenta. Like many others, we have been watching this work as it developed for several years, and have used the various methods previously published, but had felt more or less dissatisfied, and did not feel that one could be sufficiently sure of the findings to recommend it as a routine procedure. The addition of the plastic filter, as recommended in Dr. Vaughan's paper, changes the procedure from one of moderate accuracy to one in which a high degree of accuracy will be possible, and in my judgment, is one of the most valuable additions to roentgen diagnosis in several years. I am sure when the method becomes widely adopted, and radiologists become equipped with the necessary plastic filters, it will be found that this method of visualization of the placenta will be so extremely useful as to be required almost as a routine. It will certainly be essential in any case in which there is even a possibility of the presence of placenta prævia, or any of its modifications.

Furthermore, this work illustrates the importance of preserving a keen sense of imagination. Most radiologists have used plastic filters for years; this is a field in which the use of such filters is very obviously indicated, yet no one thought of it until these workers did so. No doubt we are surrounded by similar problems in which the solution is staring us in the face, but is not seen because we lack the necessary imagination. It is therefore a great pleasure to congratulate those who have shown that they possess this gift and have put it to practical use.

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"I often wish that this phrase, 'applied science', had never been invented. For it suggests that there is a sort of scientific knowledge of direct practical use, which can be studied apart from another sort of scientific knowledge which is of no practical utility, and which is termed 'pure science'. But there is no more complete fallacy than this. What people call 'applied science' is nothing but the application of 'pure science' to particular classes of problems. It consists of deductions from these general principles, established by reasoning, and observation, which constitute pure science. No one can safely make these deductions until he has a firm grasp of the principles, and he can obtain that grasp only by personal experience of the operations of observation and of reasoning on which they are founded."—T. H. Huxley, Science and Culture.

A NEW METHOD OF ELONGATING SHORT PALATES*

BY HAMILTON BAXTER, M.Sc., M.D., C.M., D.D.S.

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THE history of the development of operative procedures on the cleft palate is fascinating, in that of many types of surgical methods it is one of the few operations which can be traced to its origin with some degree of accuracy. Since many surgeons, working independently, have frequently reported new methods almost coincidentally no one man can lay complete claim to an operative procedure, since tribute must be paid to the experiences of preceding and contemporary contributors whose efforts have provided the foundation and inspiration on which some technical refinement is based.

Palatal operations were limited to simple closure of the soft palate, until 1826, when Dieffenbach[5] introduced an operation for closure of clefts of the hard palate, and, in 1861, von Langenbeck[11] advanced the method of dissecting the mucoperiosteum from the underlying palatal bone. The latter might be termed the integrator of cleft palate surgery, since the method was not only accepted by his contemporaries but is used today as the basic method of closing a cleft of the hard and soft palates.

The ultimate aim of cleft palate surgery is not only to close the defect but to establish normal speech, and in this latter objective the von Langenbeck procedure not infrequently fails. This is due to the anterior pull of the contracting scar tissue on the nasal side of the mucoperiosteal flaps so that the velum cannot be brought in contact with the pharyngeal wall, and speech assumes "cleft palate" characteristics.

Many ingenious methods have been devised to overcome this defect in the von Langenbeck operation. One group of operators sought to lengthen the palate; another endeavoured to bring the wall of the pharynx forward; a third group advised the use of artificial vela.

Obturators may be indicated occasionally in adults, but are rarely necessary in children unless some catastrophe has occurred, and none of the infinitely more desirable and purely surgical procedures can be employed.

Advancing the pharyngeal wall has been advocated, and has been effected by such methods as vertical suturing of a transverse incision,[18] formation of pharyngeal flaps,[15] injection of paraffin[8] and insertion of cartilage, but in general these procedures either do not remain effective or are actually harmful.

The concept of lengthening the palate rests upon a practical basis, and numerous operations have been proposed, using flaps from the palate, posterior pillars, buccal mucosa and even extra-oral flaps.[2, 3, 6, 7, 9, 10, 12, 13, 14, 16, 17] Some of these operations are formidable, others time-consuming, and a few result in a high percentage of failures.

Accordingly, in an effort to lengthen the palates in those cases in which the classical Dieffenbach-von Langenbeck procedure resulted in a short palate, the following methods were evolved and found to be quite effective. As noted before, when the von Langenbeck procedure has been used, the mucoperiosteal flaps granulate on their upper surfaces and the aponeurosis of the soft palate is drawn up and forward into the V formed by the posterior ledges of the palatine plates by the contracting scar tissue.

In cases in which only the velum has been cleft, the Dorrance push-back is usually adequate. However, in those in which the cleft originally extended as far as the alveolar ridge or was a complete cleft, the Dorrance procedure if carried out would leave a perforation anteriorly, which, according to modern ideas, is to be avoided at all costs.

METHODS

(*a*) *V-split flap push-back.* — In those instances in which there is only a moderate shortening of the velum, I have found very useful a combination of the Ganzer incision with the James Barrett Brown method of splitting the mucoperiosteal flap horizontally, thus leaving the nasal passages separated from the oral cavity. Figs. 1 to 3 show the steps in this procedure.

The V-shaped incision has been employed because it was found that any tendency to break through into the nasal cavity and create

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a perforation was most probable at the anterior end of the palate, especially if there is a high arch.

It should be remembered that this method is reserved for those cases in which the aperture in the oro-nasal sphincter is not too great, because there will be anterior retraction of the retrodisplaced flap due to the raw surface on the nasal side.

If there is a marked shortening of the palate the above procedure will not suffice. The ideal operation would be one which gives an epithelial covering to the upper surface of the hard palate, at least the posterior part. Axhausen[1] and Veau,[19] recent contributors to the surgical treatment of cleft palate, have not aided in solving the problem of the post-operative short palate. The former severs the aponeurosis, but the unsevered nasal mucosa does not allow the aponeurosis to fall back or down. The latter does not sever the aponeurosis.

Accordingly, recalling Sir Harold Gillies'[9]

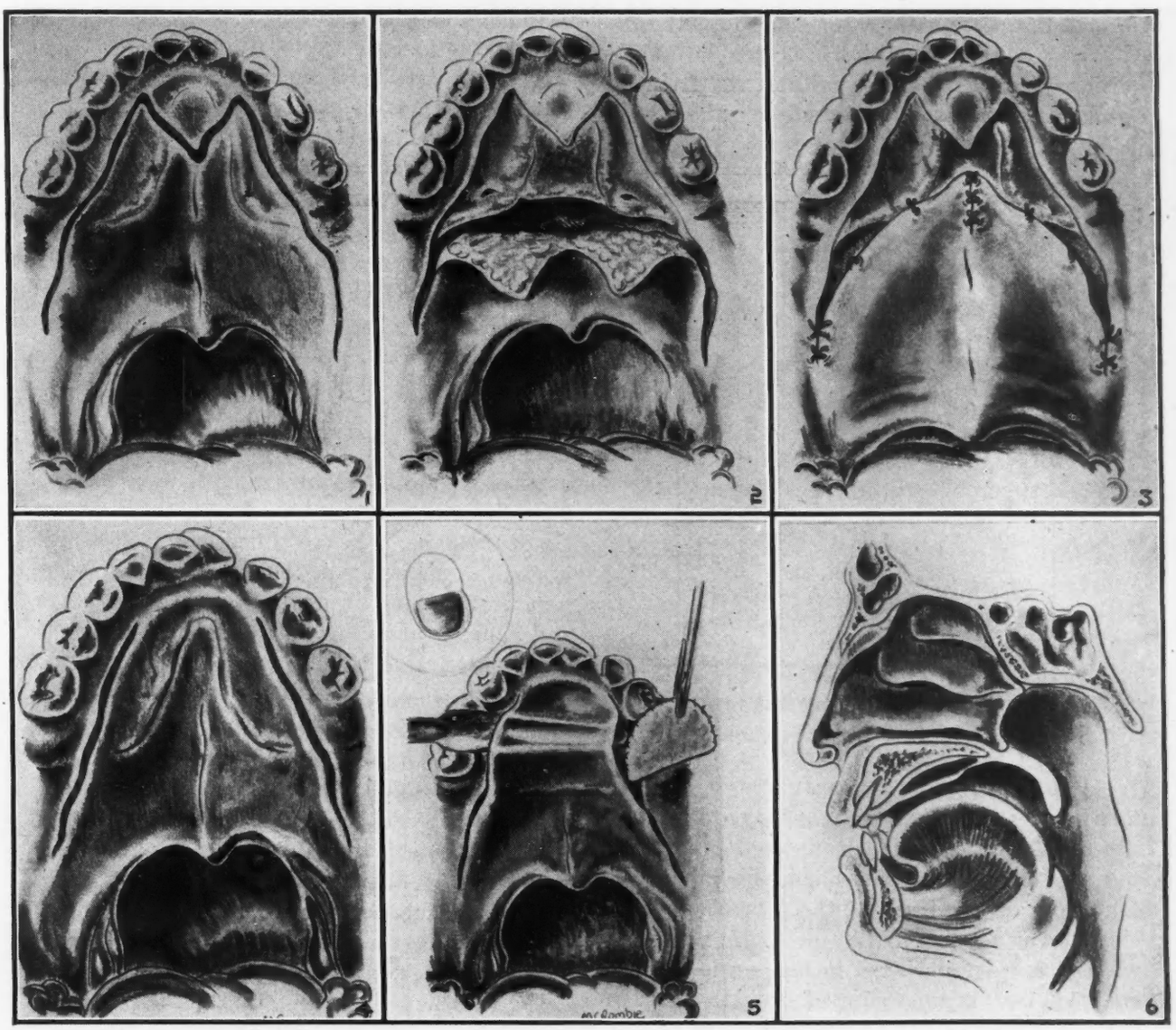

Fig. 1.—Incision for the V-split flap push-back. The V-shaped piece of mucosa is left anteriorly in those cases where there has been a complete cleft of the palate, because a perforation is most likely to occur at this point. **Fig. 2.**—Splitting the mucoperiosteal flap has been accomplished without causing a perforation into the nasal cavity. The greater palatine arteries should be severed before this step is performed to develop collateral circulation. **Fig. 3.**—The split flap push-back with the anterior edge of the flap anchored to the posterior margin of the palatal bone. Note that although there has been an apparent great gain in length there will be marked anterior contraction subsequently as healing progresses. **Fig. 4.**—Incision for the "lined flap push-back", which may be carried around anteriorly for access, if necessary (particularly if there has been a complete cleft). Adequate collateral circulation should be established prior to this step. **Fig. 5.**—Insertion of the skin graft covered wax stent into the prepared bed. **Fig. 6.**—Saggittal section showing the skin graft and stent in position.

pioneer work on epithelial inlays in the mouth, it occurred to me that an inlay skin graft to the upper surface of the hard palate, plus a push-back, might be a solution to that group of cases one sees with very short palates as a result of trauma, disease affecting the soft palate or where someone has had several failures in attempting to close the cleft palate. The method was developed on dogs in whom a cleft palate was created surgically as a preliminary measure.*

(*b*) *Lined flap push back.*—Having determined that the palate is too short to be treated by a V-split flap push-back, two lateral incisions are made a few millimetres from the gingival margins of the teeth on the lingual side (Figs. 4 to 7). These extend from the

Fig. 7.—Showing the long, non-contracting palate obtained following the push-back.

region of the canines to the tuberosities of the maxilla, or farther, if necessary, to obtain access. If difficulty is encountered in separating the flap, the incisions may be joined behind the incisor teeth if the blood supply is considered adequate. A piece of red wax, which has been sterilized in bichloride of mercury 1/1,000, is then slipped beneath the flap and shaped as to size and thickness, so that it fills the cavity but permits approximation of the edges of the wound. A thick split skin graft taken from a hairless area of the body, (*e.g.*, the buttock), is wrapped about the stent. The objective is to cover as large an area as possible with the skin graft. The edges of the graft are trimmed and sutured together. Fine stainless steel wire, No. 40 gauge, is preferred because it causes a minimum degree of reaction in the tissues. The stent, covered with the skin graft, is then slipped into the bed prepared for it and the incisions are closed with interrupted dermal or stainless steel sutures.

After a week or so, if fluid has collected about the stent it is allowed to escape by draining it somewhere along the line of the previous incision, and irrigation subsequently carried out at regular intervals.

In three to four weeks the stent is removed and the entire flap is set back. If necessary, a few millimetres of skin graft is pared off the anterior edge of the flap so that it may be sutured to the posterior end of the palatal bones and nasal mucosa.

In this way, it is possible to avoid creating a large raw area on the nasal side of the mucoperiosteal flap when the push-back is performed, and, consequently, avoid the thickening and shortening which an unlined flap with its raw surface exposed will always undergo, irrespective of its situation in the body.

It is desirable that the greater palatine arteries should be severed some time before the push-back, to prevent danger of necrosis of the tip of the flap. When a "lined flap push-back" is used, the palate is set back so freely that the palatine arteries, if not severed, act as stays and cause a humping up of the flap, which is most undesirable.

Thus, in those cases in which it is essential to obtain a marked elongation of the palate without subsequent anterior contracture, the "lined flap push-back" is especially indicated. It may be used in those instances in which the bony palate is intact and the soft palate has been severely damaged by disease, trauma, or previous unsuccessful cleft palate operations. It may also be employed in those cases of very short palates in previously repaired complete clefts, in which the mucoperiosteal flap can be split horizontally without causing a perforation.

Following operation, if there is evidence of muscle atrophy, the patient attends the cleft palate clinic for speech training. Not infrequently, physiotherapy[20] in the form of massage to the retrodisplaced palate is an excellent means of increasing functional ability.

* A grant from the Cooper Research Fund, McGill University, made this research possible.

SUMMARY

1. Closure of the congenital defect and restoration of normal speech, is the ultimate goal of cleft palate surgery; the various commonly used operative procedures to close clefts not infrequently fail in the latter objective.

2. The anterior pull of the contracting scar tissue on the nasal side of the raw mucoperiosteal flaps is largely responsible for the short palate.

3. In those cases in which there is only a moderate decrease in the length of the palate the push-back or V-split flap push-back may be used, since a great enough increase in length may be obtained to offset the subsequent contraction that will inevitably occur from the raw surface on the nasal side of the flap.

4. When there is marked shortening of the palate from any cause, the "lined flap push-back" may be used, because by eliminating the raw area on the nasal side of the mucoperiosteal flap it prevents forward contraction of the elongated palate.

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SPEECH RE-EDUCATION FOLLOWING PALATAL RECONSTRUCTION*

BY MARY HUBER, M.A.

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CHILDREN who have undergone a successful re-construction of the palate before the normal age for speech development seldom need speech re-education. But often several operations must be performed over a period of years, during which time the individual forms habits of articulation that must necessarily be overcome when the surgeon has provided him with a normal speech mechanism. From the standpoint of normal speech a functional soft palate is a most important consideration. When the velum fails to assist in naso-pharyngeal closure the patient is unable to generate the requisite intra-oral breath pressure necessary for the production of good plosive sounds, (p) (b) (t) (d) (g) (k). Fricatives, (f) (v), are similarly affected, depending upon the amount of oral breath pressure required for their proper emission, as are also all the sibilants, (s) (z) (sh) (3h). All voiced consonants are affected because their characteristic quality is altered by nasal resonance. Inadequate naso-pharyngeal closure further affects vowel quality through excessive nasal resonance.

Post-operative palatal development and function are greatly influenced by the manner in which the palate is used in speech. The main problem of speech re-education is that of training the patient to close the opening into the nose voluntarily by drawing the velum upward and backward and constricting the pharyngeal wall to meet the velum. Blowing a wind instrument aids in rendering the soft palate pliable and movable. Actual finger massage of the palate is recommended in certain cases exhibiting signs of muscular atrophy. This treatment is usually provided by the department of physical therapy.

In order to develop a conscious kinæsthetic and cutaneous imagery of the velar and pharyngeal movements certain clinical devices and exercises are recommended. One method is to have the patient force air out through passively closed lips. With very young children palatal control is sometimes accomplished by leading two lines of rubber tubing from the nostrils to an outlet so mounted on a ring stand that air from the nose is directed against a candle flame. When the child blows or talks with the velum closed the flame is not distorted,

* From the Speech Clinic, Children's Memorial Hospital, Montreal General Hospital, Montreal, Canada.

but when the velum is open he sees the flame waver. Incorrect tongue and lip positions in the production of the various consonant sounds are the natural result of compensatory adjustments of the articulatory apparatus before palatal reconstruction has been provided. The post-operative cleft-palate patient must therefore be guided into correct articulatory patterns. In order of presentation, plosive sounds usually come first as these are easier for the patient, and the experience gained from learning them carries over into the mastery of other sounds. The sounds (k) and (g) need special practice, especially if the patient has been in the habit of substituting the "glottal catch" for them. After the plosives, the sibilants, fricatives, and semi-vowels, (r and l), may be taught. The mirror is a very useful instrument in the speech clinic for objectifying the various tongue, lip, and palatal movements for the patient; with the aid of a large flash-light the patient can compare his own sound placements with the correct ones of the clinician.

One cannot over-emphasize the importance of ear-training for the recognition of the various sounds. Once the repaired cleft palate patient has learned the correct motor-kinæsthetic habits for speech production a properly trained ear must eventually supplement his regular attendance at the speech clinic. The type of speech training which teaches the patient to discriminate between his own properly articulated and defective sounds is the one that will be of the most lasting value to him.

GENITOFEMORAL CAUSALGIA*

(A NEW SYNDROME)

BY R. K. MAGEE, F.R.C.S.

Peterborough, Ont.

GENITOFEMORAL causalgia is the name we have given to what we believe to be a heretofore unrecognized syndrome characterized by pain and paræsthesia in the distribution of the genitofemoral nerve. An admittedly incomplete survey of the literature has failed to uncover any papers relating to this syndrome. The pain is typically aggravated by walking and by hyperextension of the hip. The majority of cases are seen following an operation for appendicitis, and we were tempted to call this syndrome "post appendix inguinal pain". Two cases, however, are related to other pathological processes, and we believe that the name chosen is more descriptive. Most of our patients have seen many doctors without a diagnosis having been made, and without any effective treatment having been employed. In the year since the first case was seen, seven cases have been recognized, and the five cases in which the nerve has been resected have resulted in complete cures.

It may be interesting to review the incidents which led us to believe that this was a new clinical entity. The case reports will be given in chronological order. We will abbreviate the case reports, to mention only relevant features.

CASE 1

L.P., a labourer, 35 years of age, came to my office March 3, 1941, complaining of right inguinal pain at intervals since 1935, one year after he had had an appendectomy. His pain was aggravated by walking and stooping, and had become progressively worse, and in the last two weeks he had been unable to sleep. He had complained of it while in the army and had been discharged as a malingerer. In 1939 he had been in hospital three weeks with this pain and a gastrointestinal series was negative, and he was discharged with a clinical diagnosis of adhesions in the region of the ileo-cæcal valve. On examination his maximum tenderness was over the internal inguinal ring and along the canal, with some radiation to the upper inner thigh. It was relieved by flexing the thigh. He had no hernia or other significant findings.

I advised the patient that I was unable to account for his pain, but that if he felt his disability was sufficient I would undertake to explore to see if he might have an adhesion attached to the internal abdominal ring. He stated that he could not continue working and that if I thought there was a chance of relief he would have the operation. The patient was operated upon on March 7, 1941, by right paramedian incision, with nupercain spinal anæsthetic. The cæcum and terminal ileum were adherent to the posterior parietal peritoneum over the iliac vessels, and on freeing these a nerve was seen lying on the psoas and going to the internal ring. The nerve was freed. The patient stated on the day after his operation that his pain had all disappeared and he was discharged on his 7th post-operative day. He has been followed for one year and has not lost any time since returning to work and is completely free of pain.

CASE 2

C.C., male, 41 years of age, a labourer, was seen just two weeks later, March 26, 1941, complaining of right inguinal pain. He had had an appendectomy in

* A paper read before the sixth annual meeting of the Gallie Club, Toronto, February 14, 1942.

1932, and had been in hospital in 1939 for ten days and had had right inguinal pain diagnosed elsewhere as irritable bladder or neurosis. At our examination he was very tender on inserting the finger in the inguinal canal and on pressure over the internal ring. He described a radiation of pain corresponding to the distribution of the genitofemoral nerve. He was unable to sleep and could not work for the pain. No hyperæsthesia was present. The patient was operated upon March 28, 1941, with gas ether anæsthesia. Adhesions were found pulling the cæcum and posterior parietal peritoneum down to the internal ring. These were divided and the underlying nerve was freed. The day after operation he said that his pain was gone. He was discharged on April 6th. His pain returned, however, shortly after leaving hospital, and after following this for a week he was re-admitted and re-operated upon on April 18th. Massive adhesions were found and the cæcum was plastered down over the nerve and internal ring. It was felt unwise to interfere with these, and so the nerves were resected proximal to the adhesions. The two divisions of the nerve, the external spermatic and the lumbo-inguinal were recognized then, and the true nature of the syndrome became clear. Two inches of each were resected and the cut ends allowed to retract up behind the peritoneum, which was sutured. On the second post-operative day his pain was gone and he has been free of it since and is employed as a hospital orderly.

CASE 3

R.B., a female factory employee, aged 21 years, who had had an appendectomy in 1939, was referred to me May 1, 1941. She had had intermittent right inguinal pain and pain in the upper inner thigh for one year. Pain here was a little higher than the canal, and was aggravated by walking, relieved by lying down. The patient had lost three weeks' work from the pain. She also gave a history of dysmenorrhœa since her first menstruation at 16, which meant being off work one or two days every month. Pelvic and other examinations were negative. At operation, May 12th, adhesions were found overlying the psoas but not extending down to the internal ring. Two inches of each nerve were resected and a complete presacral neurectomy was done. The post-operative course was uneventful, and she was home on the eleventh day. This patient's pain was completely relieved, and she has been free of pain with her periods for the first time in her life. She has not lost a day's work since, except for minor colds.

CASE 4

J.N., a girl of 11, who fell while bicycling, January 9, 1941, was struck by the handle bar in the left groin. She walked after the accident, but gradually refused to walk, and was being carried about the house, complaining of pain in her left hip. She was sent to me three weeks after the injury for an x-ray of her hip, and with a report of enlarged glands in the left groin. On examination she was found to hold the left hip flexed and had a very tender swelling in the femoral canal, which we thought might be incarcerated femoral hernia. At operation, January 11th, there was no hernia, but a fibrotic area of fat through which passed the lumbo-inguinal branch of the genitofemoral nerve. The fat and nerve were resected, and the patient had an immediate and permanent cure.

CASE 5

M.N., a female, 25 years of age, was seen in consultation, November 14, 1941. She had had pulmonary tuberculosis in 1933-36, complicated by left psoas abscess and Potts' disease, treated by spinal fusion in 1939. Since 1940 the patient had complained of left inguinal pain and a pulling feeling in the upper inner thigh, relieved by flexion. She had been unable to stay at work because of her pain, but was all right if resting. Examination showed definite tenderness and hyperæsthesia over the genitofemoral distribution, and her pain was aggravated by hyperextension of the thigh. It was felt that adhesions from her old psoas abscess might have involved the nerve. She has not been operated upon, as it may be that she has some reactivation of her tuberculous infection.

CASE 6

A.M., a male, aged 65, retired, was seen January 25, 1942. He had had an appendix operation 8 years before. For the past five years he had had dull right inguinal pain, becoming progressively worse. He described a pulling feeling along the inguinal canal and inner upper thigh, sometimes halfway to the knee. One year ago he was operated upon for a right inguinal hernia, but without relief of his pain. Examination showed the usual tenderness and he would wince and draw up the leg on palpation. He showed definite hyperæsthesia, and aggravation of pain on hyperextension of the thigh. This man now has two possible causes of genitofemoral causalgia, but whatever the pathology it is felt that he would have relief from resection of the nerve. He is considering the matter in the light of his age and the severity of his disability.

CASE 7

M.H., a male, aged 20, is the most recent case, and the one who has been followed the most closely. This patient had had an appendectomy in 1934. Two months after this operation he had right inguinal pain which has persisted at intervals. He had been seen by several physicians and the diagnosis had been uncertain. His symptoms were severe and he had been incapacitated for three weeks when seen on January 12, 1942. His pain was aggravated by walking, relieved somewhat by pressure of his hand so that he adopted a peculiar attitude to obtain relief. His pain had recently become constant. His earning capacity had been reduced gradually by his disability to 50 per cent of its former figure.

Examination showed that he was exquisitely tender over the inguinal canal. There was definite hyperæsthesia mapping out the distribution of the genitofemoral nerve. The pain was aggravated by hyperextension of the thigh. It was difficult to stoop or to rise from sitting, or to turn over in bed. Complete physical examination and laboratory findings revealed no other abnormality. This patient's findings were all so acute that we were somewhat hesitant about the diagnosis, and felt apologetic while taking pictures, because of his misery.

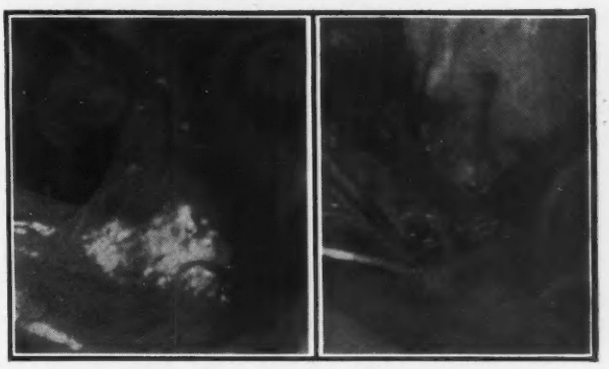

Fig. 1 Fig. 2

Fig. 1.—Shows the adhesion of the terminal ileum overlying the genitofemoral nerve. **Fig. 2.**—The two branches of the genitofemoral nerve exposed and ready for section.

He was operated upon on January 17th with nupercain spinal anæsthetic and a right paramedian incision was made. The terminal ileum was adherent over the nerves lying on the psoas. The external spermatic and lumbo-inguinal branches of the genitofemoral nerve were found lying on the psoas and two inches

of each were resected. The posterior parietal peritoneum was sutured vertically and the abdominal wall closed in layers. His relief from pain was almost immediate and dramatic. While he still had some soreness in the incision he stated that his former pain was completely gone. This patient remains completely free of pain.

The anatomy of this nerve is indicated in Fig. 3. The cutaneous branches of the lumbar plexus give rise to the iliohypogastric (I.H.), ilio-inguinal (I.I.), genitofemoral (G.F.) and lateral femoral cutaneous (L.F.C.) nerves as illustrated. The genitofemoral is first seen on the psoas major and is described as dividing

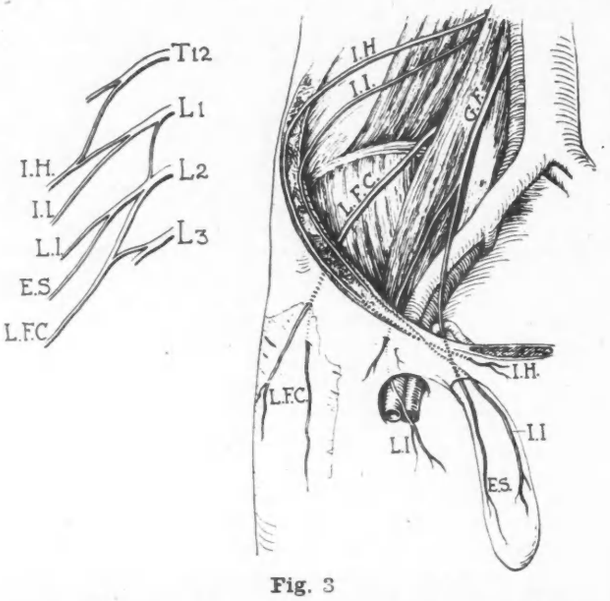

Fig. 3

into (*a*) the external spermatic (E.S.) which runs to the internal abdominal ring, and along the inguinal canal and is distributed to the skin of the upper inner thigh and side of the scrotum, and (*b*) the lumbo-inguinal (L.I.) which lies more laterally and runs below Poupart's ligament to the skin overlying the femoral ring and immediately distal to this area. Dr. R. G. MacKenzie, under Professor Grant in the Department of Anatomy at the University of Toronto, has made special dissections of these nerves and remarks on the great variation in the nerves found in this area. The genitofemoral may remain single or be found as two or three branches with a free communication with each other and with ilio-hypogastric and ilio-inguinal. This may explain the findings after section of the nerve. In every case a clinical anæsthesia resulted, but this may disappear and be undemonstrable within 3 to 4 weeks, as in case 7. The cremasteric reflex was not lost in any of our cases after section of the genitofemoral nerve.

DISCUSSION

Some time ago we studied several cases of meralgia paræsthetica which is a well recognized syndrome, made popular by Osler, involving the lateral femoral cutaneous nerve. The hyperæsthesia and pain in these cases involved the shaded area of the lateral thigh in Fig. 3. It was aggravated by standing and relieved by flexing the thigh. We concluded that freeing the nerve where it was constricted as it passed under Poupart's ligament was not sufficient, because we encountered recurrences, and we advocated resection of the nerve to effect a cure. These conclusions are paralleled by our experiences with the genitofemoral nerve.

There is one other interesting note to be made. Many surgeons have studied right lower quadrant pain following appendectomy, and some have thought that it might be due to catching the ilio-inguinal nerve in scar tissue around a gridiron incision where it is so frequently encountered. I am given to understand that one such series of cases was operated upon with this in mind, but without very satisfactory results. It may be that such cases were of genitofemoral origin and that in this syndrome we have the answer that they were seeking.

Just what relationship the appendix operation bears to this genitofemoral pain is not clearly understood. There is possibly no direct relationship between the type of pathological process in the appendix and the development of this syndrome. The hospital reports are not all available as to the type of operation and the lesion in the appendix removed, but some of the cases were considered chronic appendicitis and had no complications, were not drained, and were up in 7 to 8 days. There seems to be no relationship to the incision used, as some had McBurney incisions and others the Battle incision. It has even been suggested that the appendix may have been removed because of mistaken diagnosis when genitofemoral pain was present at the beginning.

Again we have not been impressed with the density of adhesions found about the genitofemoral nerve. The adhesions are sometimes dense, at other times filmy bands. But while the minute pathology is not completely understood, as is also the case in meralgia paræsthetica, still the relief from symptoms is certain in *bona fide* cases.

Many persons have suggested that an extraperitoneal approach would be the one of choice

for resection of these nerves. This is probably true. We were interested in these first cases in establishing the syndrome and in making all possible observations on the intraperitoneal findings. But we have seen these nerves readily accessible in operations on the lower end of the ureter and in sympathectomy and this approach may be simpler, freer from complications, and may heal faster.

In discussing this syndrome with a number of medical men from the Canadian Armed Forces, some of whom examined cases 1 and 7, considerable interest was manifested and it was felt that they were encountering these cases in the Army and had injected novocain in some without results. If this condition is kept in mind routine examinations may uncover many more cases which otherwise would be undiagnosed and unrelieved.

CONCLUSIONS

1. Seven cases of genitofemoral causalgia have been presented with complete cure in the five operated cases followed for periods up to one year.

2. We believe that this is a not uncommon clinical entity of surgical importance.

3. The cases are often misdiagnosed as neurotics or malingerers. The symptoms may be severe and the cure immediate and dramatic.

4. While the minute pathology may not be entirely clear, the cure will be none the less certain in *bona fide* cases.

Grateful acknowledgment is made to Mrs. Chubb and Miss Wishart for the Fig. 3.

RÉSUMÉ

La causalgie du génito-crural est caractérisée par de la douleur et des paresthésies dans le territoire de distribution du nerf génito-crural. La douleur est augmentée par la marche et par l'hyperextension de la hanche. La plupart des cas ont éyé observés après opération pour l'appendicite bien que la relation de cause à effet entre les deux affections ne soit pas encore élucidée. Sept cas sont rapportés et l'anatomie topographique du nerf est décrite avec minutie. La guérison est obtenue par section du nerf au niveau de la face antérieure du psoas. Les résultats sont immédiats. Il s'agit, semble-t-il, d'un syndrôme nouveau, n'ayant rien de commun avec la méralgie paresthésique. Dans le syndrôme du génito-crural, la douleur a son maximum au niveau du canal inguinal.

JEAN SAUCIER

THE ROLE OF INTRACAVITARY PRESSURES IN COLLAPSE THERAPY FOR PULMONARY TUBERCULOSIS*

BY ARTHUR M. VINEBERG, PH.D., M.D., C.M. AND WALTER E. KUNSTLER, M.D., CH.D.

Montreal

IT has been shown by Hall,[1] and later by Pearson,[2] Brooke,[3] Coryllos[4] and others, that certain cavities are in communication with a partially obstructed bronchus and exhibit intracavitary pressures. The increased pressures thus produced have been considered by Eloesser,[5] Monaldi,[6] Davidson[7] and others to be an important factor in preventing cavity closure following thoracoplasty. Eloesser,[5] for example reported six cases with "blocked cavities" in which thoracoplasty failed to close the cavity in four instances.

A further article by Eloesser,[8] published in June, 1941, in which he quotes results obtained by Rogers, was not available when our work was commenced. Eloesser moreover fails to enumerate the possible dangers associated with the determination of intracavitary pressures, nor does he make any suggestion whereby the latter may be avoided.

We are here concerned with the treatment of cavities in general and with primary or residual tension cavities in particular. By residual tension cavities are meant those cavities which before thoracoplasty might or might not have been tension cavities but which in their residual incompletely collapsed state are tension cavities.

The well known Monaldi procedure, successfully used in many clinics both in Europe and on this continent, is based upon continued cavity suction drainage. The Monaldi method maintains a consistently negative pressure in formerly positive pressure cavities, and results in the ultimate closure or reduction in size of a high percentage of large cavities. The experience of many workers, including the authors, has shown that the Monaldi method of cavity closure *per se* does not in most cases permanently close a tension cavity. It must be supplemented by thoracoplasty.

We are of the opinion that before surgical collapse methods are instituted it is of the ut-

* From the Surgical Service of Dr. Fraser B. Gurd, Grace Dart Home Hospital.

most importance to know intracavitary pressure conditions. This information can only be obtained by needling the cavity and recording the pressures. When the pressures are increased, it becomes evident that the entering bronchus is partially occluded. The condition of an entering bronchus generally cannot be observed by bronchoscopic examination. The bronchoscope will only demonstrate whether there is a partial bronchial stenosis in the first order of bronchus. Negative bronchoscopic examination therefore does not rule out disease in the fourth or fifth order of bronchus which might be draining the cavity under consideration.

TECHNIQUE FOR DETERMINING INTRACAVITARY PRESSURE READINGS

INSTRUMENTS*

The instruments used for measuring intracavitary pressures and for establishing closed intracavitary suction drainage are shown in Fig. 1. A 16-gauge Kuess initial pneumothorax needle (A_1) has been fitted completely with Luer-lok connections, including the blunt stilet (A_3), thus ensuring an air-tight system. On the shaft of the Kuess needle there is a sliding collar (A_2) which can be fixed at any point by a thumb-screw. The exploring needle (B_1, B_2, B_3) consists of a 20-gauge shaft, 12 cm. (B_4) or 15 cm. (B_1) in length. The hub (B_3) of the needle can be attached to the shaft at any point by means of a screw lock (B_2). The screw lock (B_2) contains a small rubber washer and makes an air-tight connection with the hub (B_3). The length of needle shaft required is measured by the stainless steel ruler (G).

The two metal cannulæ (F_1, F_2) were designed by Wangensteen[9] for drainage of lung abscesses. They have been modified to take a Luer-lok hub (F_3) at the non-cutting end. The hub fits both cannulæ.

TECHNIQUE

In cases with cavitation referred to the surgical service for thoracoplasty, either there has been an inefficient pneumothorax with adherent apex or it has been found impossible to induce pneumothorax. Even though the pleural space directly over the cavity appears to be obliterated, there may be small residual areas where the parietal pleura is not adherent. To avoid infecting the pleural space when needling a cavity we use a modified 16-gauge Kuess (A_1) needle, through which a longer needle of 20 gauge and 12 to 15 cm. in length can be introduced. Both needles are fitted with Luer-lok connections. Under local anæsthesia the Kuess (A_{1-4}) needle with its trocar (A_4) is introduced through the intercostal space down to the parietal pleura. The trocar is removed and replaced by the blunt stilet (A_3), which is connected to a 2-c.c. Luer-lok syringe. The parietal pleura is then punctured and a manometer attached to the side arm of the instrument by a rubber tube (H). If a free pleural space is encountered, the needle is immediately withdrawn and re-introduced at another point. When the pleural space is found to be obliterated, no pressure readings being obtained, the collar lock (A_2) on the Kuess needle is set. The Kuess needle is thus at all times kept at the same distance with regard to both the pleural space and the cavity. The distance from the chest wall to the cavity has been previously estimated by means of the tomograph. The latter distance added to the distance from the chest wall to the hub of the Kuess needle gives the approximate length of exploring needle which will be required. This length is measured on the shaft of the exploring needle (B_4) and the hub (B_3) is set at the desired point by the adjustable screw (B_2). The hub of the exploring needle is now attached to a three-way stopcock (C), which is also connected to a syringe (E) containing saline and to a manometer. The exploring needle is now introduced through the lumen of the Kuess needle until the lumen of the cavity has been entered.

As the exploring needle penetrates the chest and cavity walls, it is important to keep the stopcock turned in the direction of the syringe. The plunger of the syringe is constantly being withdrawn as the needle is pushed ahead. This is done in order to detect blood vessels in its path and also to know when the cavity lumen has been entered. The saline in the syringe guards against possible air embolism which could occur if a large blood vessel were encountered. There are two ways of knowing when the exploring needle has entered the cavity. The first is the sudden release of resistance which is felt as the needle finally penetrates the thick cavity wall. The second is the entrance of air into the saline-filled syringe. As soon as air enters the syringe the stopcock on the exploring needle is immediately turned so as to obtain manometer readings. In this way very little air is withdrawn from the cavity and none is allowed to escape. The initial intracavitary pressures can thus be accurately recorded. Unless these precautions are taken to prevent loss of air, the intracavitary pressures will be temporarily reduced. This will result in intracavitary pressure readings which will in no way be a true measurement of the initial pressures pres-

* The instruments described may be obtained from Cochrane Physicians' Supplies, Inc., 133 East 58th Street, New York City.

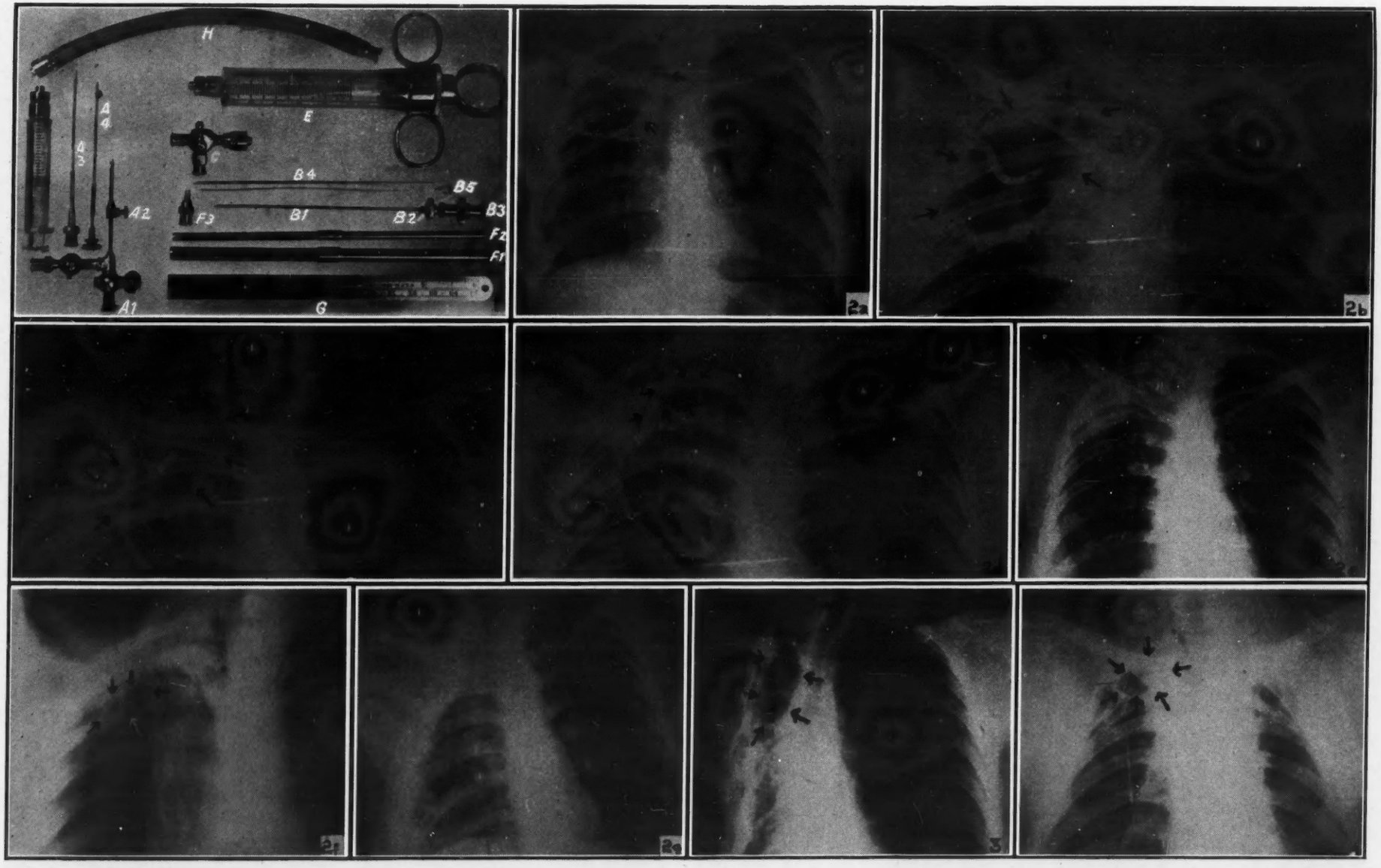

Fig. 1.—Authors' instruments for measuring intracavitary pressures and for carrying out closed suction drainage. **Fig. 2a.**—Tension cavity, 10 x 7 cm. in diameter, involving right apex. **Fig. 2b.**—The same case the day after commencement of intracavitary suction. Note position of catheter. **Fig. 2c.**—The same case 8 days later. Note reduction in size of cavity (8.5 x 6 cm.). **Fig. 2d.**—The same case 2½ months later. Cavity almost disappeared. **Fig. 2e.**—The same case. No x-ray evidence of cavity after 6 months. **Fig. 2f.**—The same case 9 months later. Tomogram showing small cavities still present in spite of negative sputum and healed sinus. **Fig. 2g.**—The same case 1 month after completion of five-rib upper-stage thoracoplasty. **Fig. 3.**—Residual tension cavity, persisting 15 months after eight-rib thoracoplasty. **Fig. 4.**—Residual tension cavity on the right side, persisting 26 months after a bilateral five-rib thoracoplasty.

ent before needling. The positive intracavitary pressures recorded in the literature by many observers are for the most part on the low side. The reasons for such low pressures become quite clear when one examines the methods used.

CLOSED TRANSTHORACIC INTRACAVITARY DRAINAGE

We have previously stated that it is of the utmost importance to know intracavitary pressures prior to instituting thoracoplasty. When apical cavities are shown to have positive pressure, it would seem logical to reduce those pressures before performing thoracoplasty. Although a cavity having a positive pressure before thoracoplasty may become a negative pressure cavity after the first or second stage, nevertheless the evidence, both pathological and physiological, argues against this probability. It is difficult to see how a diseased bronchus will be very much changed by dropping the cavity down to the level of the third or fourth dorsal vertebra. With this in mind we have felt that all positive pressure cavities should have direct intracavitary suction drainage.

The dangers of intracavitary drainage are comparatively well known. The two most important complications to be avoided are those of hæmorrhage and tuberculous empyema, both of which carry a high mortality. Using the technique of intracavitary drainage presented here, we have so far avoided the above-mentioned complications. In 1937 Wangensteen[9] described a rather ingenious method of draining non-tuberculous lung abscesses. We were impressed by its simplicity and safety and with certain modifications are now using his cannulæ and technique for the drainage of tuberculous pulmonary cavities.

Prior to the transthoracic intracavitary drainage, it is absolutely imperative that the parietal and visceral pleuræ be proved to be adherent at this point. This adherence must be over a large area. In addition to using the above-described technique for intracavitary pressure readings, it has been our custom to needle the thorax with a standard Kuess needle at four or five different points in the region of the upper lobe. In those cases where we find the pleura only partially adherent, the small pockets are injected with the patient's blood for purposes of obliteration.

TECHNIQUE

The patient is given ¼ grain of morphia and 1/100 grain of scopolamine. On the operating table the supine position is used with the arm on the affected side in full abduction. The neutral electrode of the coagulating current is placed securely in the dorsal region. Under local anæsthesia, the exploring needle is introduced through the first inter-space approximately in the mid-clavicular line directly into the cavity, as previously described (see technique of intracavitary pressure readings). Intracavitary pressure readings are taken. Before introducing a modified Wangensteen cannula, a 20-gauge spinal needle, with syringe filled with saline, is used to examine the region adjacent to the exploring needle. This is done in order to determine the presence of large blood vessels which might have been missed by the exploring needle and yet would not be missed by the larger cannula. Each time that the 20-gauge spinal needle is used, it is inserted directly into the cavity. This is done over an area slightly larger than the largest cannula to be inserted. The hub of the exploring needle, which was left in its original position in the cavity, is removed, and the Kuess needle is withdrawn.

The skin and subcutaneous tissue are incised for ½ cm. on either side of the exploring needle. The cutting half of the medium-sized cannula (F_2) is now slipped over the shaft of the exploring needle and pushed into the cavity. The exploring needle is withdrawn and the second half of the medium-sized cannula, with its attached Luer-lok adaptor (F_3), is connected to the first half. The intracavitary pressures are taken again to ensure that this cannula is within the cavity. The active coagulating electrode is applied to the cannula for approximately 20 seconds. This has been established for our machine as the time necessary to coagulate a zone of 2 mm. around the cannula on fresh beef lung. The adaptor is removed. The cutting half of the large-sized cannula (F_1) is passed over the first cannula and pushed through the chest wall into the cavity. The first cannula is removed and the upper half of the large-sized cannula is attached. The coagulating current is again applied to this cannula, and the pressure readings are taken. The upper half of the cannula is unscrewed. A size-14 Melaton catheter is used.

Two extra holes of good size are cut in the catheter wall near the tip. A piece of linen thread is tied around the catheter. This is placed at a distance from the tip, so that it will be flush with the skin when the tip is in

the cavity. The catheter is introduced through the cannula and the cannula is then removed. One silkworm stitch is used to close the skin. The tube is held in place of a piece of ¼-inch tape which is tied around the tube distal to the linen thread marker. Both ends of the tape are fixed to the skin by adhesive tape. At the end of 48 hours, suction drainage as described by Davidson[7] is commenced.

LARGE APICAL TENSION CAVITIES

The following case, one of six similar cases, is a good example of a large apical tension cavity treated by continuous intracavitary suction. Examination of the initial x-ray plates revealed a large cavity at the right apex which was presumably too large to be closed by thoracoplasty (Fig. 2a). The x-ray appearance suggested that we were dealing with a large tension cavity. This belief was further confirmed when the intracavitary pressure readings were taken and found to be −1, + 6 cm. of water. Closed intracavitary continuous suction was established (Fig. 2b) by the technique described above. Eight days after commencement of drainage the sputum became negative. Twenty-four days later the aspirated contents were free of tubercle bacilli (Fig. 2c). After 2½ months the cavity had almost disappeared. After six months had passed, the cavity appeared to be closed and the suction was discontinued (Fig. 2d). Nine months after treatment was started, the sinus tract was closed; there was no x-ray evidence of residual cavitation and there was no sputum (Fig. 2e).

Although the patient appeared to be perfectly well and ready for discharge, the surgical staff urged that a two-stage upper posterior thoracoplasty be performed. It was felt that, unless this thoracoplasty were done, the cavity would reopen, as in other cases reported in the literature. In order to appease the more conservative members of the staff, who objected to performing thoracoplasty in an apparently cured patient, tomographic x-ray studies were made. The tomographic studies revealed three small residual cavities still uncollapsed (Fig. 2f). A two-stage upper posterior thoracoplasty, five ribs in all, was done. Subsequent tomographic studies showed the cavities to be closed (Fig. 2g).

In the recent literature many workers have pointed out that closed continuous intracavitary suction will close large cavities but will only do so temporarily. There are cases reported in which the cavities have reopened after having been closed for nine months and longer. The case just described shows quite clearly that no cavity can be considered closed unless it has been examined by tomograph. It is possible that those cases previously reported by others, in which the cavity appeared to be closed and then reopened, were in fact not obliterated.

RESIDUAL TENSION CAVITIES

In the Grace Dart Home Hospital 119 cases of thoracoplasty have been completed. Of these there are 12 cases with residual cavities. These cavities have persisted in spite of multi-stage procedures including Semb apicolysis, etc. The cavities lay for the most part at the level of the fourth and sixth dorsal vertebræ. Intracavitary pressure readings recorded by needling were found to be highly positive. The two cases about to be described were picked at random to demonstrate residual tension cavities persisting after thoracoplasty.

The first case had an eight-rib thoracoplasty which was completed in July, 1940 (Fig. 3). The cavity was needled October 15, 1941, and the pressures were found to be +1, +11. The second case (Fig. 4) was a bilateral partial thoracoplasty, completed September 15, 1939. The cavity on the right side was needled November 6, 1941, and the pressures were +1, +6. Unfortunately at the time that these cases were treated we were not needling our cavities prior to thoracoplasty, so that we are unable to state whether these cavities had a positive pressure before thoracoplasty or whether the positive pressure developed from disturbances caused by thoracoplasty (*e.g.*, kinking of bronchus). However, re-examination of the x-ray plates taken before thoracoplasty revealed cavities which according to modern x-ray standards would be interpreted as tension cavities.

We do not wish to imply that all residual cavities having highly positive pressures were originally tension cavities. It does, however, seem logical to deduce that the positive pressure cavity found open after a multi-staged thoracoplasty was probably a tension cavity to begin with.

CONCLUSION

Intracavitary pressure readings should be taken in all cavities larger than 2.5 cm. prior to attempting thoracoplasty. It is our opinion that, if the pressures are increased, thoracoplasty, as an initial collapse measure, should not be undertaken. An attempt to close the cavity should be made by intracavitary suction drainage. When this is successful, thoracoplasty should be used as a supplementary procedure. In certain cases, where it is known that intracavitary drainage is to be carried out, a three-rib anterior thoracoplasty can be performed first. We believe that the dangers of hæmorrhage and tuberculous empyema can be avoided if the technique recommended be followed.

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THE TREATMENT OF EARLY SYPHILIS

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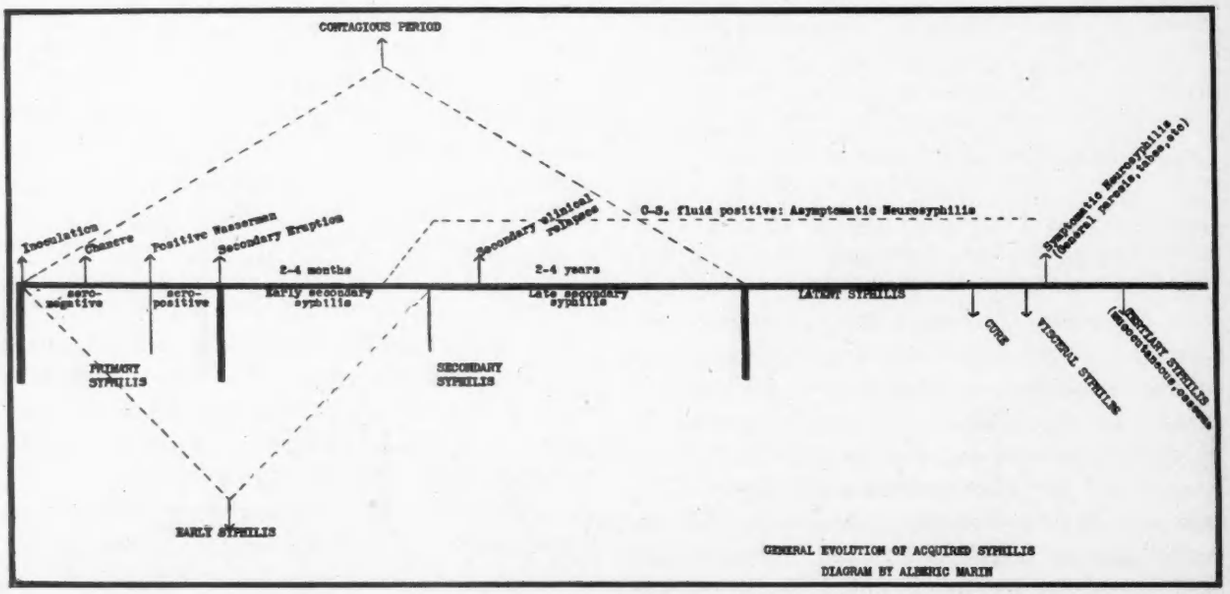
IT is a task to attempt to define early syphilis.

Everyone agrees that this phase of the disease starts at the onset of the infection, at the inoculation, but authors are apt to be vague in deciding its limits.

The different phenomena of syphilis cannot be divided into rigid types which will always show the same sequence of events in the same period of time, but we may assume that in a general way syphilis follows certain laws. This is more evident in its first manifestations.

Here is a diagram which shows the general evolution of acquired syphilis.



This is followed by the primary seropositive phase which extends from the 6th to about the 9th or 10th week. Both phases (pre-serological and serological) constitute primary syphilis.

About the 9th week the clinical secondary lesions appear. This first eruptive outburst usually lasts from one to four months, then disappears (early secondary syphilis). For reasons explained later, the frontier of early syphilis should be placed here or hereabouts.

Afterwards may be seen during 2, 3, even 4 years, but more frequently in the first year, recurrences showing various superficial lesions, on the skin and on the mucous membranes. The late secondary period has a well defined tendency towards the clinical picture of tertiary lues.

The first outburst and the recurrent secondary lesions constitute the secondary syphilis. Here ends the contagious period of the disease.

After these secondary manifestations several occurrences are possible. The patient may enter into an indefinite period of latency, which can continue all his life, giving no clinical signs,

The inoculation is followed by a period of incubation of about 3 weeks, during which the spirochætes invade the blood stream and the tissues. This invasion is almost immediate. Then appears the chancre accompanied by an enlargement of the regional lymph nodes. Approximately 3 weeks later, that is 6 weeks from the inoculation, the blood seroreaction becomes positive. Here ends the primary seronegative syphilis.

only a positive serological reaction. It is to be noted that in many instances latent syphilis starts immediately after the disappearance of the secondary rash, after which no clinical relapses are seen. This period of latency may even be followed, after an indefinite period of time, by a spontaneous cure (27 per cent, Bruusgaard). Or else, after few or many years (7 to 10 years) of latent syphilis, deep, destructive lesions may develop on the skin or the mucous membranes. Bones also can be involved. These manifestations of tertiarism are liable to persist during months or years, disappear and recur. And the disease finally returns to its latent form.

Or else, the patient will show signs of visceral syphilis, mostly of the cardio-vascular system. This visceral lues may or may not be accompanied by tertiary mucocutaneous and osseous lesions, or by nervous lues. Or else (about the 10th year or later), the patient shows clinical signs of nervous syphilis (general paresis, tabes, meningo-vascular, etc.). It is to be pointed out that this symptomatic nervous syphilis is preceded by a long asymptomatic period where a positive spinal fluid is the only sign, which can be found in the first months of the infection.

In this general evolution of acquired syphilis where is the last frontier of the so-called *early syphilis?* At what moment must we consider the infection to be no more early, but to be of some other type (delayed secondary, latent, late, etc.)?

Many may consider only seronegative primary syphilis as true early syphilis because no serological abnormalities are seen. This would be right if, in this case, our present blood tests were an indication, when negative, that the infection is not already generalized. As a matter of fact, if the chancre is a rather late affair in the evolution of the disease, the positive seroreaction is still a later affair because it shows about 3 weeks afterwards. Our serological tests have in past years vastly improved in sensitiveness. It is logical to think that if still more sensitive reactions were available, giving earlier results, the seronegative primary syphilis would entirely disappear from our present classification.

Undoubtedly the Wassermann test and others are most useful in the diagnosis of the disease and the control of its treatment, but one must not rely too much upon the present distinction of seronegative and seropositive primary syphilis. On the other hand, some regard as still of early syphilis the delayed secondary period, because the lesions are of a superficial type as in the earlier phase. This would place the last frontier at about the 4th year, which is much too far away, because the ultimate response to treatment is not the same in early and in late secondary syphilis, although the clinical lesions yield as rapidly to treatment in either case. In primary seronegative and seropositive, and even in early secondary syphilis, there are no great variations so far as time, amount of treatment and percentage of cures are concerned when adequate treatment is given (from 95 to 100 per cent cures in twelve to fifteen months). When adequate treatment is started after the first year or later, the percentage of cures fall to 80 per cent or less, although the treatment is much longer.

Therefore, using as an index the clinical and serological response to treatment and the ultimate outcome in adequately treated patients, we shall consider as early syphilis that phase of the disease which starts at the inoculation and stops shortly after the disappearance of the secondary outbreak, that is, around the 6th month of the infection. New researches on immunity show that patients treated and cured before the 6th month of their infection are susceptible to reinfection. If patients are treated after the completion of early secondary syphilis and during the establishment of latency, they acquire, when cured, a refractory state against organisms from without. This immunological factor would be another reason to set the upper limit of early syphilis at about the 6th month of the disease. It must be understood that this limit is not a fixed one and that transitional facts must be taken into account.

TREATMENT

In the discussion of the various items of this paper we shall deal only with the management of the patients in whom there are no complications imposed by age (young or old), general physical condition, other diseases, pregnancy, or treatment reactions. Fortunately the usual problem is the simple one in early syphilis. Here an ideal plan of treatment can be applied and carried on successfully in almost all.

We will insist only on those drugs which are commonly adopted on account of their good results, low incidence of accidents and ease of administration.

Arsenicals.—The old arsphenamine still is for many authors the best choice amongst the arsenicals. However, the preparation of its solution is a long and delicate procedure and if not correctly made it can give rise to grave, even lethal effects. Moreover, it takes much longer to deliver an injection of 606 than of any other arsenical (an important item in a busy clinic). If arsphenamine is superior to neo-arsphenamine when used alone, this difference disappears if either one is used simultaneously with bismuth. For these reasons it has been generally replaced by 914 whose activity is almost similar if proper dosage is maintained. Silver arsphenamine may produce argyria when associated with bismuth. Sulphurarsphenamine in adults shows a greater incidence of dermatitis. Bismarsen should be discarded in early syphilis because of its delayed action on clinical and serological signs. The pentavalents tryparsamide and stovarsol are strictly reserved for the treatment of neurosyphilis. Mapharsen brings a rapid healing of the superficial lesions and a prompt serological reversal in early syphilis. However, there are not enough collected data to evaluate accurately its end results. At the present moment its chief interest resides in massive arsenotherapy.

Bismuth.—The numerous bismuth preparations can be roughly divided into soluble and insoluble forms. They are given by the intramuscular route. The soluble salts being more rapidly absorbed and eliminated have to be given more frequently. The insoluble ones have a more prolonged effect without this inconvenience. The chemical formula of the various salts has also to be taken into account. In the United States the insoluble bismuth subsalicylate (in oily suspension) is generally considered as being the most active. In France, the insoluble hydroxide of bismuth (in oily suspension) has the same reputation.

The dosage and frequency of administration of the soluble and insoluble preparations should be determined by their content of elemental bismuth. With the oily suspension salts, Sezary advises not to exceed 0.30 ctg. per week of metallic bismuth. Thus, two commonly known French hydroxide of bismuth compounds, muthanol and neo-luatol, are repeated twice a week; each injection contains: muthanol: 0.13 ctg. and neo-luatol: 0.16 ctg. of elemental bismuth. This dosage is higher than the American one. For example, it is recommended by syphilologists of the United States to give only one weekly injection of subsalicylate of bismuth (2 c.c. in oily suspension: 0.17 ctg. of metallic bismuth). In North America also the total amount of bismuth in a series is usually much smaller (6 to 10 injections). In reality, bismuth is a well tolerated drug. It could and should be dispensed largely.

In our Clinic of Dermatology and Syphilology at the Notre-Dame Hospital we have treated several thousands of patients with courses of 30 to 40 injections of hydroxide of bismuth. We have observed in many some local discomfort, but no evidence of liver or kidney damage. The incidence of stomatitis is low in those who pay constant attention to oral hygiene and where a preliminary dental prophylaxis is done. In toothless persons the stomatitis is almost nonexistent.

The therapeutic efficiency of bismuth is lower than that of arsenicals, but much higher than that of mercury. According to Irgang, Alexander, and Sala, in early syphilis a reversal of the blood Wassermann reaction is obtained in 80 per cent of the patients with 20 weekly injections of subsalicylate of bismuth. The association of bismuth and arsenicals administered simultaneously is a very important point which will be discussed later. Different attempts have been made to administer bismuth orally. This method is inefficacious.

Mercury.—This is now generally replaced by bismuth which is more efficient and presents a lower incidence of accidents.

The iodides.—The iodides have no place in the treatment of early syphilis. Nowadays with the arsenicals and bismuth their use is no longer necessary. Sézary, appraising theoretically the values of the antisyphilitic drugs in the treatment of early syphilis, gives 10 to the trivalent arsenicals, 8 to an active bismuth salt, 4 to mercury and no mention to the iodides.

It is strange to note that even today, in many schemes of treatment for early syphilis, mercury and iodides are still mentioned in place of bismuth or alternating with bismuth (in alternating courses with arsenicals). This is still advocated in spite of well-known facts; when given alone bismuth is superior to mercury alone; when in combination with arsenicals it is still superior to combined arsenic and mercury. The reason for alternating with bismuth is the possibility of the production of a drug-fast strain of spirochætes. This theoretical danger is not

to be compared with the real ones following an inadequate treatment with an inefficacious drug.

In the first years of the arsenotherapy, neoarsphenamine was portioned out overcautiously in small doses, slowly increasing (0.15, 0.30, 0.45, 0.60, 0.60, 0.60) in a series of a few injections (5 to 6) with a small total amount and an interval of a month or more between each series. This was planned to avoid reactions in the patient but experience has proved that the spirochætes were the principal beneficiaries in this method. There is a remnant of this excessive prudence in some modern schemes of treatment.

The small doses of 914 are not therapeutic doses. They should be used once or twice in new patients only to find out their degree of tolerance (mostly in regard with the nitritoid crisis and gastro-intestinal disturbances). The maximum dose should be reached not later than at the 3rd injection. In order to get the maximum effect with high doses these should be given as soon as possible. In a new patient 0.30 ctg. is given on the first day, 0.60 ctg. on the 3rd, 0.90 ctg. on the 8th. This last dose is repeated weekly. If the maximum dose is reached only on the 15th or 20th day, there is a great loss of time. For subsequent courses the initial dose should be the maximum one, straight off.

Most authors advise taking the weight of the patient as an index to determine the maximum therapeutic dose. It is preferable to take as a guide the tolerance of the individual, disregarding sex and weight. If a woman of 100 pounds tolerates well an injection of 0.90 ctg. (and she usually does) we think it is of more benefit to her than one of 0.60 ctg. This is not excessive dosage if we take into consideration that in treating congenital syphilis the advocated weekly dose is 25 mg. of sulpharsenamine per kilogram of weight. This ratio would authorize us to give to an adult of 100 pounds 1.25 g. of 914 and 2.50 g. to an adult of 200 pounds. In addition, the new method of massive arsenotherapy with its huge dosage, irrespective of sex and weight, where the patient is literally inundated with arsenic, shows us that 0.90 ctg. is rather small. This point of view is shared by many. Milian goes still further. He prescribes weekly injections of 1.40 g. in men of 160 pounds.

In 1932 in our Clinic we have treated with intensive and prolonged arsenotherapy (914) a group of 67 patients. Though the average age was 24 years, 7 were over 40.

TABLE I.

INTENSIVE ARSENOTHERAPY (914) DURING 6 TO 10 MONTHS

Number of patients: 67 (48 men, 19 women)
Average age: 24 years (7 were over 40)

Months	6	7	8	9	10 +
Patients	8	5	13	5	36
Total dosage of 914 (grams).	18 to 25	22 to 32	26 to 36	30 to 40	33 to 45

The treatment, without any consideration to sex or weight, consisted in weekly doses of 0.90 ctg. or more of 914, given for 6 months or more, without interruption. Our only guide was the tolerance of the patient. To 40, it was possible to administer weekly injections of 1.25 and 1.20 gram. In others this amount causing gastro-intestinal reactions, 0.90 ctg. or more rarely 0.75 ctg. was considered the maximum dosage. This difference in the reactions of the patients gave a certain variation in the total amount received during the same period of time; for instance 18 to 25 g. were administered to the 8 patients who were treated during 6 months, and 33 to 45 g. to those who were treated during ten months or more. In this series of 67 patients, no major reaction was observed. However, the incidence of gastro-intestinal disturbances being high with a gram or more per week, we have followed a general rule of giving a weekly dose of 0.90 ctg.

The interval of a week between each injection is well justified by the rate of elimination. French authors claim that, roughly, neoarsphenamine is eliminated at the rate of 0.20 ctg. per day. A dose of 0.90 ctg. is considered to be eliminated, except residual traces, within five days. All syphilologists agree nowadays that treatment should be continuous. With intermittent treatment, the periods of rest allowed the patient are in truth periods of rest for the spirochæte.

There is wide variation in the conception of what is continuous treatment. In France arsenic and insoluble bismuth are given simultaneously during two months and a rest of one month between each course. This is accepted as a continuous treatment because of the slow elimination of the insoluble salt. In the United States treatment is called continuous when alternating courses of arsenic and bismuth or mercury* are administered without rest intervals (arsenic during 6 to 8 weeks immediately followed by 4

* We doubt if alternating courses of arsenicals and mercury with iodides can be really considered a continuous treatment. The weeks spent in the administration of mercury and iodides are lost to a large extent.

to 10 weeks of heavy metals). But there are some syphilologists who think that the continuous treatment should be managed more intensively so far as the rapid increase in doses, the combination of the drugs, their weekly dosage, and their total amount in a short time is concerned.

After many experiments, we have utilized the following scheme of treatment: 914 is given weekly and simultaneously with bismuth. Both drugs are administered simultaneously in their maximum dosage as if either one was given separately. This combined bismuth-arsenical treatment is continued during five months without interruption. Some may think this amount of treatment excessive. However it is justified by its high proportion of cures and low incidence of reactions.

In a recent study of the Johns Hopkins' material, Padget has shown that in those early syphilitics in whom the treatment was continuous during the first 6 months, even if the treatment for the subsequent 6 months was inadequate, cure could be attained in 75 per cent. We believe that 20 injections of 914 given in 5 months with the addition of an insoluble bismuth, given simultaneously without interruption, is more than the equivalent of a 6 months' treatment of the alternating type.

The simultaneous administration of arsenicals and bismuth has been carried on in many large clinics for 20 years. In Denmark, England and in France this is done systematically. The combined treatment is open to many objections, the main one being that if the heavy metal produces renal damage the excretion of the arsenic is lowered and its toxicity increased. This objection is more theoretical than practical. In the last 15 years this procedure has been followed by almost all French syphilologists. Their reports are unanimous in saying that it does not give a higher incidence of toxic reactions than when either drug is used separately. Therapeutic effects are cumulative while toxic effects are not.

Moreover, it is claimed that the serological reversal is attained sooner, with a higher proportion of cures, than when these drugs are used alternatively. For many years we have been practising this intensive conjugated treatment. We have found that it is well within the tolerance of the average one. We did not observe with it a higher incidence of serious reactions.

TABLE II.

INCIDENCE OF POST-ARSPHENAMINE REACTIONS (NOTRE-DAME HOSPITAL)

From 1932 to 1941 { 1932 to 1936: period A; 1937 to 1941: period B

7,862 patients received { 151,487 injections of arsenicals; 90,594 injections of bismuth

Number of patients is about the same in both periods.

During both periods the average amount of arsenicals to each patient is the same. During period B, the average amount of bismuth is higher: 8 to 5.

Major dermatitis	
Injections of arsenicals	
Period A .... 22—1 per 3,892	
Period B .... 19—1 per 3,465	
Decade 1932 to 1941 ..... 41—1 per 3,678	C.C.G. data: 0.8 per 1,000 injections
Jaundice	
Injections of arsenicals	C.C.G. data: 1.20 per 1,000 injections
Period A .... 5—1 per 17,128	U.S. Navy data: 1 per 40,000 injections
Period B .... 4—1 per 16,462	German Salvarsan Commission: 1 per 6,364 injections (914)
Decade 1932 to 1941 ..... 9—1 per 16,832	
Granulopenia	
Decade 1932 to 1941—1 in 7,862 patients with 151,487 injections of arsenicals.	
Encephalopathy	
Decade 1932 to 1941—1 in 7,862 patients with 151,487 injections of arsenicals.	C.C.G. data: 1 in 22,500 patients
Polyneuritis	
Decade 1932 to 1941—2 in 7,862 patients—in 3,931 with 151,487 injections of arsenicals.	C.C.G. data: 1 in 3,700 patients

In our Clinic, in the last ten years (from 1932 to 1941) 7,862 new cases have been treated by 151,487 injections of arsenicals and 90,594 of bismuth. Some followed the treatment regularly for several months, others more or less for many months; others abandoned it early. Our routine has generally been a sharp increase in doses, high weekly doses, prolonged series. In the first five years (period "A", 1932 to 1936) *alternating* courses of neoarsphenamine and bismuth were more commonly employed. In the last five years (period "B", 1937 to 1941) *conjugated* courses of neoarsphenamine and bismuth were usually given. The number of patients treated in each of these two periods is about the same. Proportionately, all the patients received as many injections of 914 but those treated in the last five years by the conjugated method received on an average much more bismuth than those of the first group (ratio 8:5).

With our material we are unable at the present moment to give accurate data concerning the proportion of cured or uncured patients. With our newly reorganized social service we hope to be able to do it in the near future. For the discussion of this topic, this, however, is less important than the incidence of serious reactions, which we are in a position to show, as everyone agrees that the chances of cure increase with the precocity, intensity and prolongation of the treatment. We are limited in this direction only by the tolerance of the patient. If we compare the proportion of accidents in our own material with those observed in other groups we can state that our scheme of treatment is as well tolerated as less intensive ones.

In the last decade our incidence of major dermatitides was 1 per 3,465 injections of arsenicals; it was roughly similar in the two periods although more bismuth was given simultaneously in period B. The Clinical Co-operative Group found an incidence of 0.81 per 1,000 injections of arsenicals given alone.

It must be pointed out that the incidence of so-called post-arsphenamine jaundice is not an accurate criterion, because a large proportion is due to other factors than arsenic (cholecystitis, cancer, acute catarrhal icterus, etc.) and also (if these other factors are eliminated) because it is far from being proved that its pathogeny is always a toxic one. So according to observers and their theories, there is a large discrepancy in the various reports. The incidence of post-arsphenamine jaundice is 1 per 1,000 injections of arsenicals in the C.C.G. data and only 1 in 40,000 in the United States Navy. During the last decade in our material we had an incidence of 1 in 16,832; the two periods offered about the same proportion, whether or not bismuth and arsenic were combined. We also observed 1 case of encephalopathy in these 7,862 patients (C.C.G. 1 in 22,500) and 2 cases of polyneuritis (C.C.G. 1 in 3,700). We had one case of granulopenia.

These compared figures indicate clearly enough that the association of bismuth and arsenicals given continuously and intensively during a prolonged period is well tolerated by the average patient. This intensive, combined and prolonged (5 months) first attack is furthermore well justified by another reason, a psychological one, which is left in the background by almost all except by the partisans of massive arsenotherapy, that is the *goodwill* of the patients. It is all very well to state that from 95 to 100 per cent of the early syphilitics will be cured in 12 to 15 months of adequate treatment, but one has to ask: how many patients will co-operate as long as a year? What will become of those who will co-operate only for the first few months, if only a moderate amount of arsenic and bismuth is administered?

In our Clinic, from January, 1940, to January, 1941, out of 124 patients with early syphilis, 60 discontinued their treatment before the completion of the 5th month or followed it very irregularly during that period. During the same twelve months out of 165 patients with other forms of syphilis (latent, benign late, nervous), 84 discontinued their treatment or neglected it before the completion of the 5th month. (The children are not included in these two groups, because it is independent of their own will if they are treated or not). Out of the 50 co-operative ones (for only 5 months) half, that is 25 per cent, came regularly for the following 6 months.

After this five months' attack the infection is well under control. Clinical lesions have disappeared at the end of the first month and the Wassermann reaction was reversed to negative at the end of the 2nd or 3rd month. A rest period of three weeks is ordered, which is only apparent because of the continuous absorption of the insoluble bismuth which has been given concurrently with the arsenicals. In many patients who did not have any further treatment and seen a year or more after its cessation the spinal fluid and blood reactions were negative. As the probability is that there is a certain proportion of "uncured" the treatment will be continued. It is not necessary to carry on so intensively but continuously, with alternating courses of trivalent (10 weeks) and bismuth (10 weeks).

When should the treatment be stopped?

Opinions here again differ greatly. Some authors, particularly the French, consider that in early syphilis it should be carried on for at least four years. Others think that a continuous alternating treatment for a period of one year in seronegative syphilis and for one year after the establishment of a negative serological state in seropositive cases (providing the spinal fluid is normal) is sufficient for early syphilis. With this system the C.C.G. found out from 95 to 100 per cent of cure. We entirely agree with the latter group, so much the more that our

scheme of treatment is much more intensive in the first 5 months.

In seronegative syphilis blood tests should be made every week for at least the first 4 to 5 weeks in order to determine the stability of the reaction and then repeated every month throughout the treatment. In seropositive syphilis it should be made at first every two weeks in order to fix the date when it becomes negative, and then repeated every month throughout the treatment.

TABLE III.

TREATMENT OF EARLY SYPHILIS

Weeks	*914*	*Hydroxide of bismuth*
1st day	0.30	2 c.c.
3rd "	0.60	2 c.c.
8th "	0.90	2 x 2 c.c.
3rd week	0.90	2 x 2 c.c.
4th "	0.90	2 x 2 c.c.
5th "	0.90	2 x 2 c.c.
6th "	0.90	2 x 2 c.c.
7th "	0.90	2 x 2 c.c.
8th "	0.90	2 x 2 c.c.
9th "	0.90	2 x 2 c.c.
10th "	0.90	2 x 2 c.c.
11th "	0.90	2 x 2 c.c.
12th "	0.90	2 x 2 c.c.
13th "	0.90	2 x 2 c.c.
14th "	0.90	2 x 2 c.c.
15th "	0.90	2 x 2 c.c.
16th "	0.90	2 x 2 c.c.
17th "	0.90	2 x 2 c.c.
18th "	0.90	2 x 2 c.c.
19th "	0.90	2 x 2 c.c.
20th "	0.90	2 x 2 c.c.
21st "	REST	
22nd "	REST	
23rd "	REST	
24th week	0.90	..
25th "	0.90	..
26th "	0.90	..
27th "	0.90	..
28th "	0.90	..
29th "	0.90	..
30th "	0.90	..
31st "	0.90	..
32nd "	0.90	..
33rd "	0.90	..
34th week	..	2 x 2 c.c.
35th "	..	2 x 2 c.c.
36th "	..	2 x 2 c.c.
37th "	..	2 x 2 c.c.
38th "	..	2 x 2 c.c.
39th "	..	2 x 2 c.c.
40th "	..	2 x 2 c.c.
41st "	..	2 x 2 c.c.
42nd "	..	2 x 2 c.c.
43rd "	..	2 x 2 c.c.
44th "	0.90	..
45th "	0.90	..
46th "	0.90	..
47th "	0.90	..
48th "	0.90	..
49th "	0.90	..
50th "	0.90	..
51st "	0.90	..
52nd "	0.90	..
53rd "	0.90	..
54th "	..	2 x 2 c.c.
55th "	..	2 x 2 c.c.
56th "	..	2 x 2 c.c.
57th "	..	2 x 2 c.c.
58th "	..	2 x 2 c.c.
59th "	..	2 x 2 c.c.
60th "	..	2 x 2 c.c.
61st "	..	2 x 2 c.c.
62nd "	..	2 x 2 c.c.
63rd "	..	2 x 2 c.c.
64th "	0.90	..
65th "	0.90	..
66th "	0.90	..
		ETC.

This five months' conjugated course is followed by alternating courses of 914 and bismuth.

Some syphilologists recommend doing a spinal fluid test at the 6th month, others at the end of the first year. It is imperative that it should be done as early as possible and by all means before the completion of the treatment. Almost all cases of late neurosyphilis developing in cooperative patients happened in those unfortunate ones who had a negative blood reaction at the completion of their treatment, and where their physicians were satisfied with this incomplete criterion.

To summarize, let us say (*a*) in seronegative primary syphilis the average duration of treatment should be of one year at least: conjugating trivalent and bismuth continuously during the first five months, then alternating without interruption arsenic and bismuth for the consecutive months (one series of arsenic, one of bismuth and a last one of arsenic); (*b*) in seropositive primary syphilis and early secondary syphilis treatment should be of about fifteen, eighteen months, that is a full year at least after the blood reaction has reversed to negative, which happens usually around the 2nd or 3rd month. Thus, if the Wassermann is negative at the end of the second month, the first five months' attack is carried on; after a three weeks' rest: one series of arsenic, one of bismuth, one arsenic and a last one of bismuth. If mapharsen is used, it should be at least twice a week (0.06 ctg. even 0.10 ctg. at each injection). We do not know at the present moment if this drug will give as good ultimate results as those with 914.

Even if the seroreactions have been negative for a full year, if the patient did not follow the treatment regularly or did not receive a reasonable total amount of arsenic and bismuth, he should be treated for a longer period. If not, he is more exposed to a relapse.

PROBATION

At the cessation of the treatment begins the probation period. Here again, authors disagree. Some think that a post-treatment observation of two years is sufficient while others pretend that it should last a lifetime. A five years' probation should be considered as a strict minimum, according to the latest researches (Padget). During the first year, blood tests should be made every month, with a spinal fluid examination at the end of that year, and frequent physical examinations. During the second year, blood and physical examinations every 3 or 4 months. During the 3rd, 4th and 5th years, every six months. Some advise a last lumbar puncture at the end of the 4th year, which is a sound procedure.

Male patients may be allowed to marry at the end of the first year of probation. If a woman under probation becomes pregnant during the

first five years after the cessation of treatment it is advisable to treat her during her pregnancy.

MASSIVE ARSENOTHERAPY

During the past five years attention has again been drawn to the rapid cure of syphilis. The initial "five days' treatment" by the slow intravenous drip method (to avoid speed shock) has gone through various modifications. Mapharsen, because of its lower incidence of reactions, has replaced neoarsphenamine. By many it is still given in its original way: 0.24 ctg. of mapharsen are given intravenously in 1,600 c.c., slowly in 8 to 10 hours, every day, during five days, with a total dosage of 1,200 mg. This amount is given indifferently to men and women, without consideration to weight. Some dispense the same amount in also five days but in a rapid intravenous drip: 0.24 ctg. of mapharsen in 800 c.c. in 2 to 3 hours, every day. Others, always by the slow or rapid drip method, will administer the 1,200 mg. in a longer period of time (6 to 10 days). Another group disregarding the menace of the "speed shock", use an ordinary syringe to give the 1,200 mg. by 4 daily injections, 0.06 ctg. during five days. Some give this amount with the syringe at the rate of 0.10 ctg., twice a day, for 6 days. Finally there are many others who work in various ways, that is distributing the 1,200 mg. in 10 days, in 20 days, even associating it with fever therapy.

Of these different schemes of a "blitz" attack on the spirochæte, it is too early yet to state that the end results are favourable and, if so, which is the best procedure. Further conclusions will be reached only after the passage of many more years. However, the immediate results, clinical and serological, are well known and interesting from many standpoints. This method is inefficacious in late syphilis. The lesions of early syphilis disappear in about the same time as with the combined arsenic-bismuth method. Reports from different sources on the immediate serological reversal vary from 75 to 85 per cent in cases of early syphilis. It is too early to state how many will be permanent.

In these statistics are included patients whose treatment has been completed only a few months previously. The spinal fluid findings are not mentioned. However these would be remarkable results if the incidence of serious reactions was about the same as with the routine therapy. Unfortunately the percentage of accidents and deaths is much higher. Besides nausea, fever, phlebitis, local pain, purpura, exfoliative dermatitis, two serious reactions are liable to occur with massive arsenotherapy which are uncommon with the usual treatment — peripheral neuritis and hæmorrhagic encephalitis. Hæmorrhagic encephalitis in the United States Navy, between 1925 and 1935, happened only *once* after 1,000,000 injections of neoarsphenamine, in routine treatment. At Johns Hopkins, the incidence of this encephalopathy is *one* in 22,500 patients treated by various arsenicals, in routine treatment.

According to the various latest reports on massive arsenotherapy with mapharsen, hæmorrhagic encephalitis occurs in 1 per cent of the patients with a death rate of approximately 0.3 per cent (1 death in 300 patients or 1 death in 3 cases of encephalopathy). This has to be compared with what was found by Hahn, in a recent study of Johns Hopkins material: a death rate (different causes) of 1 in 2,800 patients treated by various arsenicals for early syphilis, by the routine treatment. Peripheral neuritis occurs in about 8 to 10 per cent of the cases.

This is not due to mapharsen, because this complication (as hæmorrhagic encephalopathy) was not encountered among the 4,800 patients treated by 64,000 injections of mapharsen at Johns Hopkins. With other arsenicals in routine therapy, the incidence of polyneuritis was 1 in 4,000 patients. In our Clinic, in the last 10 years (1932 to 1941), with 151,500 injections of various arsenicals given to 7,862 patients we had two cases of polyneuritis and one of encephalopathy. Toxic erythemas, similar to the erythemas of the 9th day, occur in the proportion of 10 to 12 per cent.

It must be pointed out that this hyperintensive method cannot be considered as an out-door department routine. Patients must be hospitalized and carefully followed. All these reasons have restrained many large clinics from using it.

If it is possible in the near future to decrease its dangers and simplify its procedure, the massive arsenotherapy will be of invaluable help in the fight against syphilis, especially in the present times where the increase of this disease in our civilian and military population is taking alarming proportions.

SUMMARY

Early syphilis should be treated at the earliest possible moment with the maximum tolerated doses of arsenicals combined with bismuth. This

conjugated bismuth-arsenotherapy should be administered without interruption (if no contra-indication) in a course of 5 months.

This first attack is followed by alternating courses of arsenicals and bismuth for at least twelve months after the serological tests have become negative.

A subsequent observation of the patient is indispensable for the following five years, comprising physical, blood and spinal fluid examinations.

The intensive combined procedure of the first five months is well tolerated and is well justified by the fact that after the 5th month a high proportion of patients neglect their treatment or abandon it completely.

I am indebted to Dr. Earle Moore for having found much valuable information in his book: "Modern Treatment of Syphilis".

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MASSIVE ARSENOTHERAPY IN EARLY SYPHILIS BY THE CONTINUOUS INTRAVENOUS DRIP METHOD*

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MANY attempts at rapid sterilization of the body by massive arsenotherapy have been made. Because of the dangers involved, it became necessary to revert to small divided doses given at regular intervals for one to two years. This prolonged routine standard treatment for syphilis results, according to the Co-operative Clinical Group,[1] in a loss of 84 per cent of patients before adequate minimum treatment is given. Marin[2] states that 50 per cent of his patients with early syphilis lapse from treatment during the first five months, *i.e.*, within the communicable stage of the disease.

In 1932 Dr. Louis Chargin proposed that the slow drip method of Hirschfield, Hyman and Wanger be utilized to permit the introduction of large amounts of arsenic in the treatment of early syphilis. In his last published paper[3] he reported results in a series of 298 patients that he was able to follow. He further elaborated on his results before the American Academy of Dermatology and Syphilology, December 19, 1941. His findings were highly encouraging, the incidence of cure being 92 per cent. It must be remembered, however, that many years must elapse before the term cure can be used. The incidence of reactions, however, was high. Most of these were of a minor nature except for hæmorrhagic encephalitis. When the change of drug was made, from neoarsphenamine to mapharsen, the incidence of encephalopathy fell markedly and there were no fatalities.

The United States Public Health Service[4] reported five deaths in 2,000 patients treated in various centres, *i.e.*, one in 400 patients. It must be noted, however, that these included patients treated with both neoarsphenamin and mapharsen and by the multiple injection, as well as the slow drip technique. Chargin reported no deaths in his series of 298 patients treated with mapharsen and in the discussion Rattner stated that in his group of 300 patients there were likewise no fatalities. These workers did report, however, a 1 per cent incidence of encephalopathy.

The results obtained by Chargin and later workers in this field were so encouraging and the importance of the problem from a public health standpoint so great, that this work was initiated at the Montreal General Hospital by Dr. (now Surgeon Lieutenant Commander) D. S. Mitchell. The first three cases were treated by him and the subsequent ones by the authors.

TREATMENT

The technique of treatment is simple but does require hospitalization of the patient.

The apparatus required consists of a gravity

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flask and two lengths of rubber tubing connected by a Murphy drip. The drug used is mapharsen, which has been found to be as effective as and much less toxic than neoarsphenamin. The drug is dissolved in a solution of 5 per cent dextrose in triple distilled water in the proportion of 60 mg. of mapharsen to 600 c.c. diluent. The patient receives each day 240 mg. of mapharsen in 2,400 c.c. of the 5 per cent dextrose solution, divided between two flasks. The rate of flow is approximately 100 drops per minute and the full dose has been injected by the end of six to seven hours. The needle is then withdrawn, and re-inserted the next morning. This procedure is carried out daily for five consecutive days until 1,200 mg. of drug have been administered. The choice of the vein is important. For the comfort of the patient, the site for the insertion of the needle has been a vein on the forearm below the cubital fossa. This permits free movement of the elbow and the patient may assist in feeding and in nursing procedures. There is also less danger of dislodging the needle from the site of insertion.

The nursing problem consists in connecting the second flask at the end of 3 to 4 hours, at which time the second two ampoules of 0.06 gm. mapharsen each are dissolved. Meals are served in the ordinary way. Some assistance is necessary with the urinal and the bedpan.

The patients are given a high calorie, high carbohydrate diet, and a large glass of orange juice in mid morning and afternoon. In the afternoon, after discontinuance of treatment, they may get out of bed. They suffer little or no discomfort and many register a gain in weight. The routine examination before institution of treatment consists of the following: (1) physical examination; (2) urinalysis; (3) complete blood count; (4) blood chemistry, including van den Bergh and renal function test; (5) x-ray of chest; (6) electrocardiogram; (7) ophthalmoscopic examination.

The first four procedures are repeated at the close of treatment, at which time a spinal fluid examination is made.

Only those patients with primary or early secondary syphilis, *i.e.*, within four or five months of the inception of the disease, have received treatment. Further, only those with excellent health have been accepted as candidates for this procedure.

In all 38 treatments have been given to 36 patients. One woman was re-treated because of a persistent positive blood Wassermann at four months, and one man was re-treated for a re-infection. Thus, 37 infections received treatment. The ages of the patients ranged from 18 to 52. Of these, 26 were males and 10 females. Fifteen patients were in the sero-positive, two in the sero-negative, and twenty in the secondary phase of the disease.

Reactions from Intensive Treatment

The reactions (Table I) were those observed by other investigators. For the most part these have been of a minor nature. Nausea, vomiting and pain up the arm have occurred in almost all the patients. Nausea and vomiting occurred in almost all of the patients on the first day, frequently associated with slight headache. In a few patients nausea was present throughout the course of treatment.

Table I.

Massive Intravenous Arsenotherapy in Syphilis
Reactions to Treatment

Number of treatments	38
Vomiting	
First day	35
Throughout	2
Fever	
First day	27
Sixth day	11
Toxic erythema	5
Peripheral neuritis	3
Purpura simplex	1
Local pain	36
Encephalopathy (convulsion with disorientation)	1

Pain radiating up the arm was usually slight, but on occasion it was very severe.

Fever was present in the majority of patients towards the end of the first day and was normal the next morning. This reaction was interpreted as a Herxheimer effect. In a few cases there was low-grade fever persisting throughout the course of treatment. In no instance, however, was it found necessary to discontinue treatment because of high fever. Secondary fever has occurred in ten of our series. It appeared usually in the evening of the last day of treatment, persisted for a day or two and then disappeared. This was associated with a toxic erythema in 5 patients, an incidence of 13 per cent. The erythema, morbilliform in character, appeared on the sixth day and lasted two or three days. It was symptomless but did prolong the patient's stay in the hospital by two or three days.

Paræsthesias of the hands and feet were noted by three patients. The discomfort, mild in degree, developed two weeks after treatment and persisted for from one to three weeks.

One instance of purpura of the extremities was noted. This could well have been due to the administration of sulfathiazole for a complicating chancroid infection.

One instance of encephalopathy was observed. On the sixth day this patient had a series of three convulsions within a few hours associated with disorientation. Twenty-four hours later he was quite normal.

A spinal fluid examination was made in 35 patients on the sixth day. There were three instances of abnormalities. These consisted of a weakly positive Wassermann test, pleocytosis, a positive globulin and in one instance a change in the colloidal gold curve. The tap was repeated in one patient three months later. At this time the findings were normal.

In our series of cases there have been no instances of exfoliative dermatitis or of renal, hepatic, or other parenchymal damage. Nitritoid crises and blood dyscrasias have been entirely absent.

RESULTS

The results obtained cannot adequately be evaluated at the present time. An attempt is made to maintain contact with the patient at least once monthly when a quantitative blood Wassermann test is performed. For follow-up purposes, it is unfortunate that many of our patients were transients or members of the merchant marine. Previous reports have indicated that cure is obtained in 95 to 100 per cent of those with primary syphilis, in the sero-negative or sero-positive phase, and in 92 per cent of all those treated. Seven patients in our series with primary syphilis who have been followed a minimum of three months, have a negative blood Wassermann reaction; three have been lost from observation; the status of the others is uncertain. Those that were negative remained negative, while those that were positive reverted to negative within two months. The reaction in the secondary stage reverts much more slowly. The majority of these patients have been treated too recently to permit evaluation of the effects of treatment. Three months after treatment four showed complete, and two partial reversal of their serological state. One patient was re-treated when the Wassermann reaction four months after the original treatment began to revert to strongly positive after an initial weakening. Four patients have been lost from observation, while the status of the remainder is still pending. It is our feeling that the earlier the patient is treated, the better the result. It is wise to remember, however, that eight or ten months may elapse before there is a complete reversal of the serological state in those with secondary syphilis.

COMMENT

Results obtained by means of massive arsenotherapy compare favourably with those reported by the best clinics with routine standard therapy. When one takes into consideration, however, those who lapse from the latter form of treatment, the percentage of cures obtained is considerably less. Moore[5] reports cure in only 65 per cent of that group. With the five-day treatment method each patient receives a full course of treatment; there are no laggards. Thus, there should be a distinct lessening in the incidence of late incapacitating syphilis, with a resultant saving in cost to the community. Cormia[6] has reported that 85 per cent of the direct costs of treatment in Montreal are due to the care of central nervous system syphilis alone. It might be well to point out here, too, that the direct cost of the five-day treatment is considerably less than that of adequate routine standard therapy, aside from loss of time. The cost of the former is approximately one-half that of the latter.

From the public health standpoint, too, this method of treatment holds one's interest, for patients are isolated during the period of greatest transmissibility of the disease. That reservoir for the transmission of syphilis will be dried up and the future should see a marked lessening in the incidence of fresh infections.

Finally, rapid sterilization and cure of the patient would appear to be ideally applicable to those in the military services, the merchant marine and other transients, for reasons only too obvious to be mentioned.

Although this method is hopeful and promising, there are certain drawbacks to its general use. Hospitalization is required and there are insufficient hospital beds available. Further, cerebral complications have been encountered which, although few in number, are still more commonly encountered than with routine standard treatment. To offset this, severe complications such as the erythrodermas, blood dyscrasias, nitritoid crises and severe jaundice, which complicate standard routine treatment, do not occur

with the five-day treatment. It is difficult to obtain exact figures on the incidence of these complications, but Moore[7] agrees with both Cole and Phelps that treatment deaths from routine standard treatment approximate 0.3 per cent. It is entirely probable, therefore, that in so far as the occurrence of all reactions is concerned, the five-day treatment method is as safe as the present standard procedure.

We wish to thank Dr. J. F. Burgess, Head of the Department of Dermatology, the Montreal General Hospital, for permission to report this work.

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PREOPERATIVE SEDATION IN CHILDREN*

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I WANT briefly to review a few basic points in the physiology of anæsthesia, which as you know is produced by the reduction of the reflex activity of the nervous system. Reflex activity itself is directly proportional to the metabolic rate, which in turn is variable depending on the age, sex, temperature, glandular activity and emotional state of the individual.

Du Bois and Benedict have demonstrated that the caloric output or metabolic rate is normally highest at 6 years, falls slightly to 10 years, rises during puberty, and slowly declines to old age. Since reflex activity and metabolic rate are parallel, such a chart gives us a starting point for estimating the basal requirements for anæsthesia. It is readily seen that even without outside stimulation, such as fear and emotion, the child between 6 and 14 years will tolerate larger amounts of anæsthetic and drug therapy per pound of body weight than at any other period of its life.

Factors that increase the metabolic rate and coincidently the reflex activity, increase the amount and potency of anæsthetic necessary in the individual case, and, conversely, factors that reduce the one reduce the other. Fear, excitement, sleeplessness, elevated temperature and abnormal endocrine activity are important items, so that preoperative recognition and judicious control of those factors are definitely indicated for the welfare of the patient.

For example, take the patient, admitted in the morning for tonsillectomy. In spite of years of effort our profession cannot convince parents or be convinced themselves, of the advantages of admitting the child the night before. Consequently there is a restless night, early rising, hasty dressing, no breakfast (much water), rushed to hospital, through the admitting examination, needles for clotting time, and hypodermic. Rushed upstairs, undressed by strangers, nervous parents watching, rolled on a stretcher; kissed "good-bye" by a tearful mother, and wheeled screaming upstairs to my tender care. A short — we hope — road to oblivion, but to the child, a horrible smell, a horrible sensation, a terrifying experience. Waking up, sick, vomiting, sore throat, more strangers. What is that child's never-to-be-forgotten impression of hospitals? From a scientific point of view, what is its metabolic rate at the beginning of anæsthesia? Adults, you who know what is going to happen to you, you have a sedative, you go into the hospital the night before, waken up, have a hypodermic of morphine and hyoscine, come up to the operating room with a "jag" on, but probably scared stiff. Primarily, it is probable my maternal instinct that rebels at screaming inductions, but my professional conscience and pride come a close second.

The preoperative medications available today are legion, but mainly are: (1) The opiates, with which you are familiar. (2) Drugs, including the barbiturates, which produce a state of basal anæsthesia.

Basal anæsthesias aim at the comfortable production, preferably in bed, of a sufficient depth of narcosis that surgical anæsthesia may be obtained and maintained by minimum amounts of inhalation or regional agents. None of the basal types, except evipal or sodium

* Read at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June 25, 1941.

pentothal intravenously, should *ever* be pushed to surgical anæsthesia.

The barbiturates comprise an important and valuable group of central nervous system depressants. New ones are constantly being produced under confusing trade names, but the fundamental action does not differ much from the first ones, — barbital and phenobarbital. Barbital was first introduced in 1903 as veronal, and phenobarbital next as luminal. Latterly more than a score have been synthesized and marketed; for instance, amytal, dial, evipal, sodium ortal, pentobarbital sodium (nembutal), phanodorm, noctinal, delvinal sodium. The most recent advance is the substitution of sulphur for oxygen in the chemical formulæ, producing the thiobarbiturates. In passing I would like to draw your attention to the fact that sodium pentothal is a sulphur compound and thus is definitely contraindicated as an intravenous anæsthetic in conjunction with sulfanilamide therapy.

The fate of the barbiturates in the body depends on their chemical structure, barbital and phenobarbital being excreted in the urine, nembutal, evipal, thiobarbiturates destroyed in the body tissues, delvinal in the liver. All are depressants of the central nervous system, affecting the cerebral cortex and diencephalon. They all depress the motor cortex, inhibiting convulsions, but phenobarbital has a selective action on the motor cortex not shared by the others, hence its value in epilepsy. They all act on the internuncial neurones, rather than on the afferent or motor fibres, causing a blocking of the cortex, first liberating conscious control, then in descending, affecting the vegetative centres in the mid brain controlling sleep, and as the stages of saturation proceed the subcortical centres controlling vasomotor and respiratory reactions, finally to brain stem paralysis. Death is due to respiratory failure. In ordinary hypnotic and preoperative doses only the first stages of loss of memory and conscious control are produced, with varying degrees of narcosis. There is little effect on respiration and in those showing a slight depression, it is, I think, due to the cutting off of some of the numerous respiratory centres scattered through the cortex and midbrain. Modern physiologists apparently do not agree that we are equipped with just one respiratory centre in the medulla, but have numerous scattered ones, with the coordinating control centre in the medulla. There is no cardiovascular effect except through sedation. Death from therapeutic doses is unknown, there being no case on record of serious complications from either a single or repeated doses. Severe poisoning has occurred in doses 5 to 10 times the full hypnotic dose, which of course should never occur in sane medication.

The barbiturates differ from morphine in that they are *not* analgesics, and are useless in controlling pain, but in severely disturbed patients, as in cerebral irritation, toxic delirium, psychoses, the soluble sodium luminal is extremely useful. They are powerful anticonvulsants, so are direct antidotes for strychnine, cocaine or novocaine poisoning and should routinely be used preoperatively in local anæsthesia. Conversely, the convulsants strychnine, metrazol, picrotoxin, are antidotes for both the barbiturates and avertin.

They may be given orally, rectally or intravenously (special preparations). Rectal suppositories must be used 1 to 2 hours preoperatively. Nembutal capsules may be punctured and used rectally at least 1 hour before operation.

Orally, for general surgery and eye cases I give small doses at bedtime and the usual dose 45 minutes preoperatively. For tonsils and adenoid operations with nembutal, one dose 45 minutes preoperatively with atropine is given. For children coming in the morning, if possible the mother gives nembutal at bedtime and a smaller dose of codeine is given preoperatively. Delvinal sodium is more soluble, so can be given in a small enema or *ex aqua* by mouth. It is a lighter barbiturate, eliminated faster, and has less "hangover", so may safely be given at bedtime and preoperatively as well. Supposedly it is associated with less restlessness than the others, but the nurses report little difference. I find it more useful for home therapy.

Doses quoted are:

	Nembutal	*Delvinal*
2 to 3½ years,	gr. ½ to ¾	gr. ½ to 1
3½ " 5 "	" ¾ " 1¼	" 1 " 1½
5 " 7 "	" 1 " 1½	" 1¼ " 1½
7 " 11 "	" 1½ " 2	" 1½ " 2¼

Sodium luminal (hypodermically)

2 to 4 years	gr. ⅛ to ¼
4 " 6 "	" ¼ " ½
6 " 10 "	" ½ " 1
10 "	" 1 " 1½

Series of cases public tonsils and adenoids

Females	360
Males	370
Codeine postoperatively	45
Hæmorrhage postoperatively (none concealed)	16
Co-operative	690
Non-co-operative	60
Pale or dusky (one seriously depressed after induction)	28
Chest complications (all recovered with little trouble)	3

ADVANTAGES

1. Psychic. Difficult to overestimate the value of loss of fear.
2. Reduction in amount of anæsthetic used, 1/4 to 1/3. Less vomiting.
3. Postoperative amnesia and rest.
4. Economy. Time and cost. Saving of opiates for war use.

DISADVANTAGES

1. Individual investigation of patients.
2. Postoperative nursing care. Watch for relaxed jaw and restlessness.
3. May be difficult for anæsthetist to estimate stages of anæsthetic due to eye changes and reflexes. Tendency to have too light an anæsthesia.

AVERTIN

Must be mixed carefully and in fresh solution. Rectal only. Quiet natural sleep, lasting 1 to 1½ hours. Asleep on reaching operating room. Pale, shallow respirations, blood pressure falls 10 to 30 points; returns to normal with ether. Restless postoperatively. Coramine is antidote. Expensive, the average dose costing 80 cents in comparison with 5 to 8 cents (including postoperative period) of the barbiturates.

I want to thank the nursing and intern staff of the Children's Hospital for their co-operation and assistance and the surgeons for their tolerance in my estimation of dosages.

POST-ANÆSTHETIC COMPLICATIONS IN A MILITARY HOSPITAL

BY S. M. CAMPBELL, M.B., D.A., MAJOR, R.C.A.M.C. AND
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THIS report is based on an analysis of 2,094 anæsthetic records. These cases include all those patients anæsthetized during one year on all the services of a military hospital. We feel that they may be of special interest because all the patients fall within a well defined age-group, and were in almost all cases entirely well except for their present surgical disability. The majority of the operations were procedures which are not of themselves associated with high mortality or morbidity rates. We believe that such a group of patients should provide an excellent opportunity for the study and comparison of anæsthetic agents and techniques with relation to post-anæsthetic complications. It is for that reason that we present this report.

Each of the patients included in this series was seen before operation by one of us when practicable, and in the other cases was examined by another member of the staff of the hospital. An attempt has been made to record all pre-anæsthetic complicating factors, especially those relating to the respiratory tract. After operation each patient was seen at least once by us when the pressure of work permitted, and we have seen all patients who were reported by the surgical or nursing staffs to have any evidence of a complication following anæsthesia. We have had excellent co-operation in this respect, and are satisfied that the post-anæsthetic records relating to the factors included in this report are fully adequate. While we have endeavoured to record all complications which could reasonably be related to the anæsthetic procedure, particular attention has been paid to post-anæsthetic pulmonary complications, which will be discussed at rather greater length than others.

In this general survey of the whole group of cases we do not attempt to relate one set of factors to another, and attention should be drawn to the fact that the general figures presented in Table I may give rise to false impressions unless they are related to the more particular analyses in subsequent sections of this report. With the exception of the total number of cases in each group, percentages alone are given without particular figures, since we feel that it is only as they are related to a standard in this way that the figures given have any practical value.

Not included in this Table is one case of mediastinal emphysema which followed tearing

TABLE I.

Anæsthetic	Number of cases	Pre-anæsthetic complications						Abnormalities during anæsthesia								Post-anæsthetic complications									
		Respiratory infection	Recent respiratory infection	Cough	Shock	Hæmorrhage	Food and drink	Respiratory rest	Laryngeal spasm	Obstructed airway	Intubation	Vomiting	Cyanosis	Surgical shock	Supplementary anæsthesia	Atelectasis	Cough and sputum	Pneumonia	Emboli	Vomiting	Headache	Shock	Respiratory depression	Retention	Distension	Jaundice
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Cyclopropane	701	2.0	1.0	1.0	0.4	0.3	0.5	2.7	3.0	2.2	19.0	0.3	1.5	0.3	..	2.0	5.0	0.3	0.3	10.0	0.1	0.3	0.3	1.0	0.5	0.1
Ether	98	..	1.0	..	12.0	8.0	2.0	2.0	1.0	1.0	21.0	5.0	1.0	1.0	..	4.0	15.0	1.0	..	27.5	2.0	..	1.0	4.0	3.0	..
Ethyl chloride	2	100.0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nitrous oxide	61	1.6	..	..	..	..	3.3	..	1.6	..	..	1.6	1.6	..	..	..	3.3	..	..	15.0	..	..	..	8.0	1.6	..
N2O + ether	103	..	..	3.0	1.0	..	..	..	..	2.0	39.0	4.0	2.0	..	..	3.0	10.6	..	..	22.0	..	2.0	..	4.0	1.0	..
Pentothal	465	3.0	0.4	2.0	1.0	0.4	2.0	..	0.4	0.2	..	0.6	1.0	..	..	..	1.5	0.4	..	0.9	0.9	..	0.4	..	..	..
Procaine spinal	266	11.0	4.5	4.5	1.0	..	0.7	..	..	..	..	6.4	..	0.7	12.0	6.7	17.0	2.0	..	6.7	11.0	..	0.4	5.0	2.0	..
Percaine spinal	40	10.0	..	5.0	5.0	..	..	..	..	..	..	10.0	5.0	2.5	30.0	7.5	15.0	5.0	..	10.0	2.5	..	..	5.0	25.0	..
Procaine and percaine	71	7.0	3.0	10.0	..	..	1.4	..	..	..	..	1.4	..	1.4	7.0	11.0	27.0	3.0	..	8.4	10.0	..	..	3.0	1.4	..
Decicaine spinal	10	..	22.0	..	..	..	..	..	..	..	..	..	..	11.0	44.0	11.0	33.0	..	..	..	..	..	..	..	..	..
Decicaine and procaine	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	100.0	..	..	..	..	..	..	..	..	..	..
Caudal block	226	2.6	1.0	0.4	..	..	0.4	..	..	..	..	0.4	..	1.3	7.5	0.4	1.0	..	..	4.0	0.9	..	..	0.9	..	..
Peripheral block	50	4.0	..	4.0	2.0	..	2.0	..	..	..	..	..	..	..	20.0	..	..	..	..	4.0	..	..	..	..	..	..

of the dome of the pleura while performing a brachial plexus block (Gordon), a complication which proved not to be serious, but which we are satisfied not to repeat.

Relation of post-anæsthetic pulmonary complications to anæsthetic respiratory infection.—We have tabulated pre-anæsthetic respiratory complications in three groups. (1) Active respiratory infection at the time of operation. (2) Recent respiratory infection: those patients who give a definite history of a respiratory infection within two weeks of operation. (3) Cough: those with a cough at the time of operation, but no other evidence of respiratory infection.

Post-anæsthetic pulmonary complications have likewise been divided into three groups, which we have designated as: (1) atelectasis; (2) cough and sputum; (3) pneumonia. The criteria for this classification are as follows.

1. *Atelectasis.*—Those patients in whom it has been possible to demonstrate clinically collapse of a portion of lung, with absent breath sounds or bronchial breathing, respiratory distress, and shift of the mediastinum. These patients also have a moderate fever ranging from 100 to 103° F. The distress and fever disappear rapidly when therapy is directed at draining away secretion and re-expanding the affected portion of the lung, although the mediastinal shift and cough with sputum may persist for several days.

2. *Cough and sputum.*—Patients who have cough and sputum after anæsthesia, with a low-grade fever, a few coarse râles in the chest, but no evidence of consolidation or mediastinal shift. X-ray pictures of the chest show nothing in these patients. Such patients are frequently reported as bronchitis or post-operative pneumonia. They do not run the course of a pneumonia, and they clear up quickly with posturing, coughing and hyperventilation in the same way that the atelectatic patients do. We believe that these patients suffer from a patchy atelectasis, but in the absence of definite proof of this we prefer to avoid fruitless controversy by labelling them simply with their symptoms.

3. *Pneumonia.*—Patients with signs of pneumonic consolidation in a lung, fever, cough and sputum. These patients do not clear up immediately as do those of the first two classes, but run a course of days, with a gradually subsiding fever which disappears with disappearance of signs in the chest.

To these three groups we might add a fourth, to include cases of pulmonary embolism. In this series of cases we have experienced only two cases of embolism, both of them minor, with the patients surviving. The first occurred on the tenth day in a patient suffering from fracture of the pelvis and traumatic rupture of the urethra, and the second on the fourteenth day in a patient who had had a laparotomy. Both patients had cyclopropane anæsthesia.

The figures in this Table need little explanation. It is evident that the presence of a respiratory infection or cough, or the history of a recent respiratory infection may lead one to expect a higher proportion of post-anæsthetic pulmonary complications, no matter what agent or technique is used. The increase is more marked with spinal anæsthesia than with cyclopropane anæsthesia. The small number of patients with respiratory infection

TABLE II.

Pre-anæsthetic respiratory infection	All cases					All spinals					Procaine spinal					Percaine spinal					Decicaine spinal					Procaine + percaine				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%
Active respiratory infection	81	44.0	6.0	32.0	6.0	38	55.0	10.5	39.4	5.0	29	47.0	10.0	31.0	6.0	4	100.0	25.0	75.0	..	0	..	..	..	..	5	20.0	..	20.0	..
Recent respiratory infection	33	36.0	3.0	33.0	..	16	50.0	..	50.0	..	12	50.0	..	50.0	..	0	..	..	..	..	2	50.0	..	50.0	..	2	50.0	..	50.0	..
Cough	40	57.5	7.5	50.0	..	21	66.0	9.0	57.0	..	12	67.0	17.0	50.0	..	2	50.0	..	50.0	..	0	..	..	..	..	7	71.0	..	71.0	..
No respiratory infection	1938	4.6	2.2	2.0	0.4	312	23.0	8.0	13.0	2.0	213	18.5	6.0	11.0	1.5	34	18.0	6.0	6.0	6.0	7	43.0	14.5	28.5	..	57	38.0	14.0	21.0	3.4

Pre-anæsthetic respiratory infection	Cyclopropane					Ether					N2O					N2O+ether					Pentothal					Procaine blocks				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%
Active respiratory infection	17	23.0	..	17.0	6.0	1	..	..	..	..	1	100.0	..	100.0	..	2	100.0	..	100.0	..	14	28.0	..	14.0	14.0	8	50.0	12.0	38.0	..
Recent respiratory infection	11	9.0	9.0	..	..	1	100.0	..	100.0	..	0	..	..	..	..	0	..	..	..	..	2	50.0	..	50.0	..	3	..	..	..	..
Cough	9	55.0	11.0	44.0	..	0	..	..	..	..	0	..	..	..	..	3	66.0	..	66.0	..	8	25.0	..	25.0	..	3	..	..	..	..
No respiratory infection	664	5.9	1.6	4.2	0.1	96	20.0	4.0	15.0	1.0	60	..	..	..	..	99	10.0	3.0	7.0	..	441	0.4	..	0.4	..	262	..	..	..	..

in the other groups makes it unwise to compare them.

Influence of upper abdominal operation on post-operative pulmonary complications.—It has long been known that inflammatory processes or surgical invasion of the upper abdomen lead to an increase in the liability to post-operative pulmonary complications, through reduction of respiratory movements and the voluntary suppression of cough, because of pain. Table III provides a comparison of the pulmonary complications following these operations with the post-anæsthetic complications of all other types of procedure, for those agents which were used for upper abdominal operation.

These figures demonstrate again the increased incidence of pulmonary complications following upper abdominal operation. This Table should be kept in mind when interpreting the data in Table I, where the high incidence of pulmonary complications following spinal anæsthesia is due in part to the fact that most

TABLE III.

	All cases					All spinals					Procaine spinal					Percaine spinal				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%
Upper abdominal operation	53	56.5	20.7	28.3	7.5	42	56.7	26.0	26.0	4.7	19	73.5	31.5	36.8	5.2	9	55.0	22.0	22.0	11.0
Other than upper abdominal	2029	8.6	1.9	6.4	0.35	345	25.5	5.8	18.3	1.4	247	22.7	4.9	16.2	1.6	31	18.7	3.1	12.5	3.1

	Procaine + percaine					Cyclopropane					Ether				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%	%		%	%	%	%
Upper abdominal operation	14	35.2	21.0	14.2	..	4	25.0	..	..	25.0	5	100.0	..	80.0	20.0
Other than upper abdominal	57	38.5	8.7	29.8	..	697	7.1	1.8	5.2	0.1	93	16.1	4.3	11.8	..

of the upper abdominal procedures were done with spinal anæsthesia.

Relation of endotracheal intubation to post-anæsthetic pulmonary complication.—It has been a popular conception, especially amongst surgeons, that endotracheal intubation during anæsthesia increases the number of post-anæsthetic pulmonary complications. Table IV makes a comparison of the incidence of such complications in patients intubated with the incidence in those who were not. That the incidence of complications in those intubated is less, is probably due first to the exclusion from the trachea of infection and mucus from the mouth, and secondly to the opportunity presented to the anæsthetist for removing mucus from the trachea by suction through the tube.

Relation of anæsthetic agent and technique to post-anæsthetic pulmonary complication.—In order to make a fair comparison of the complications following anæsthesia with different agents it is necessary, so far as it is possible, to control all other variable factors. A comparison without such control may be made from Table I. Table V makes a comparison between pulmonary complications following anæsthesia with spinal agents and cyclopropane for the repair of inguinal hernia. These groups are sufficiently similar in numbers, and in the number showing pre-anæsthetic respiratory infection, to warrant comparison.

In this relatively small series it is evident that the incidence of post-anæsthetic pulmonary complications is greater with spinal anæsthesia.

Supplemental inhalation agents with spinal anæsthesia related to post-anæsthetic pulmonary complications.—Table VI makes a comparison between the incidence of post-anæsthetic pulmonary complications in those cases of spinal anæsthesia with supplement and those which were not supplemented.

Since patients with respiratory infection or

TABLE IV.

	All cases					Cyclopropane					Ether					N2O+Ether				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%
Intubation—No previous respiratory infection.	184	3.7	..	3.2	0.5	129	4.5	..	3.8	0.77	18	5.5	..	5.5	..	35	..	..	..	..
Intubation—Previous respiratory infection..	7	43.0	..	43.0	..	4	25.0	..	25.0	..	1	..	..	..	..	3	100.0	..	100.0	..
All cases intubated.....	191	5.8	..	5.5	0.27	133	5.2	..	4.5	0.75	19	5.2	..	5.2	..	38	7.9	..	7.9	..
All cases not intubated.....	911	8.9	2.2	6.5	0.22	568	7.5	2.2	5.2	0.17	79	23.9	5.0	17.7	1.2	65	6.3	4.6	1.7	..

TABLE V.

	Procaine spinal					Percaine spinal					Procaine + percaine					Cyclopropane				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%			%	%	%	%		%	%	%	
Hernia—Active or recent respiratory infection.....	10	50.0	10.0	40.0	..	2	50.0	..	50.0	..	9	66.0	..	66.0	..	6	49.0	16.0	33.0	..
Hernia—No respiratory infection.....	39	33.3	15.4	15.4	2.5	6	33.2	16.6	16.6	..	34	44.0	8.8	29.4	5.8	43	23.2	4.6	18.6	..
Hernia—All cases.....	49	36.6	14.2	20.4	2.0	8	37.5	12.5	25.0	..	43	48.7	6.9	37.2	4.6	49	26.6	6.1	20.5	..

TABLE VI.

	All cases					Procaine spinal					Percaine spinal					Procaine + percaine				
	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia	Number of cases	Total complications	Atelectasis	Cough and sputum	Pneumonia
		%	%	%	%		%	%	%	%		%	%	%	%		%	%	%	%
Supplemented spinals.....	38	34.0	10.5	13.0	10.5	24	42.0	16.6	16.6	8.8	9	22.0	..	..	22.0	5	20.0	..	20.0	..
Not supplemented.....	339	27.0	7.6	18.0	1.4	242	24.6	5.7	17.7	1.2	31	25.6	12.8	12.8	..	66	42.0	12.0	27.0	3.0

upper abdominal operations are distributed approximately in the correct proportion between the two groups, they have not been shown separately in the Table. In this series we find a slight increase in post-anæsthetic pulmonary complications following supplemental inhalation anæsthesia. It should be remarked that this increase in the whole group appears to depend on the increase in the procaine group. In the percaine and percaine plus procaine groups there were actually fewer complications in the supplemented than in the unsupplemented groups. The difference in numbers in these two latter groups may well have some bearing on this.

SUMMARY

1. A general survey is given of the pre-anæsthetic complications, complications during anæsthesia, and post-anæsthetic complications in 2,094 patients anæsthetized in a military hospital during the course of one year.

2. Comparison is made between post-anæsthetic pulmonary complications in those patients with a pre-anæsthetic respiratory infection and those with no such history. The incidence of pulmonary complications is markedly increased by a present or recent respiratory infection, no matter what the agent used.

3. The influence of upper abdominal operation on post-operative pulmonary complications in the series is shown by comparison of patients undergoing such an operation with those undergoing other types of operation with the same anæsthetic agents. There is a very great increase in pulmonary complications following upper abdominal procedures.

4. Comparison of patients who had endotracheal intubation with those who were not intubated shows a smaller percentage of post-anæsthetic complications in the intubated group than in the others.

5. Comparison of post-anæsthetic complications following use of spinal agents and cyclopropane for the repair of inguinal hernia demonstrates no significant difference in the presence of respiratory infection (active or recent). In cases where no history of respiratory infection exists the complication for cyclopropane anæsthesia is much less than that for the spinal agents.

6. The effect of adding a supplemental inhalation agent to spinal anæsthesia is studied. In this series the incidence of post-anæsthetic pulmonary complications is slightly greater in the supplemented group than in those not supplemented.

INDICATIONS AND CONTRAINDICATIONS IN SPINAL ANÆSTHESIA*

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EXPERIENCE with spinal anæsthesia has developed until today it is recognized as an indispensable aid to the successful completion of many operative procedures that under deep general anæsthesia are impossible, or attended with a high mortality and morbidity rate. Spinal block is being extensively used in the larger hospitals and clinics with an ever-increasing appreciation of its advantages and disadvantages. In these centres anæsthetists, acquainted with the physiology, physics and anatomy of subarachnoid block, and trained to observe pending dangers and to cope with all emergencies as they arise, have greatly reduced the contraindications of this technique. The comparatively simple operation of a lumbar puncture, contrary to some opinions, is a very small and often least important part of a spinal anæsthetic. It is only by constantly emphasizing and keeping to the fore the importance of weighing in every individual case the indications and contraindications of this technique that we are going to develop alert, skilled spinal anæsthetists instead of mere "tappers".

It is impossible to catalogue separately the indications and contraindications in spinal anæsthesia, for a deterring factor in one case might under slightly altered circumstances have no influence in another case. Throughout this

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discussion I will consider the two phases together.

Surgeons and anæsthetists inexperienced in subarachnoid block, inadequate operating room equipment, and the lack of the essentials to cope with spinal shock are definite contraindications in spinal anæsthesia.

We all have had patients who presented a strong antipathy to spinal block. Personally I have refrained from forcing the issue, as any untoward neurological symptom, pathological or functional, will surely be laid at the door of the anæsthetist. Should the objection be due to a desire "not to know what is going on" the patient can be assured that adequate premedication or one of the combined techniques will produce sufficient unconsciousness to allay all apprehension.

Age is no barrier to this technique. Junkin reports the successful administration of 1.5 c.c. of nupercaine for an operation to correct a congenital anomaly of the œsophagus that required two and a half hours anæsthesia, to an infant two days old, weighing four and a half pounds. All of us can recall experiences with the aged. However, the very young and the very old patients require most careful consideration before exposing them to the risks of a subarachnoid block. Of children Robson writes: "There is a definite place for this means of abolishing pain in children, but it is limited. We feel justified in using spinal only when some one or other of the general anæsthetics is not suitable." In the aged the high instance of cardio-vascular changes, the frequent association of degenerative process in other systems call for caution. In our experience we have found that this group of patients tolerate small doses well.

We have not experienced shock through paralysis of the sympathetic[1] that some writers cite as occasionally occurring with small dosage, unless two cases in a series of 2,769 cystoscopic examinations and transurethral resections could be explained by sympathetic block. This early collapse has not been seen any oftener in the aged where small amounts of procaine have been injected than in the good risk group where large or moderate dosage was employed. The combined nupercaine spinal and cyclopropane anæsthesia extensively used at the Toronto Western Hospital and outlined in a paper by Meredith,[2] gives to the octogenarian the advantages of spinal anæsthesia for upper abdominal surgery without the hazards of large doses of spinal agents and heavy premedication. The young, robust and muscular individual is often difficult to control with inhalation anæsthesia but is an excellent subject for spinal block.

The location of the operative field is an important factor in determining the type of anæsthetic to be employed. It is generally conceded by most authorities that spinal anæsthesia should be confined to operations below the diaphragm, that its greatest field of usefulness is in abdominal surgery, and that it should not be used for minor operations, which can adequately be performed under field block or some gaseous anæsthetic agent. I wish to add my endorsement to this last view. The spinal enthusiast too often resorts to the anæsthetic of his choice without considering the rare complications to the technique which although rare should never be hazarded without justification. Thoracic and intrathoracic operative procedures have been performed under spinal anæsthesia but the trend today is toward general anæsthesia. This latter technique avoids the additional strain of high spinal on the circulatory system, which is always severely taxed in intra-thoracic surgery. It abolishes the cough reflex which may spread infection and which in the open chest is inefficient to expel obstructive material from the airway.[3]

In abdominal surgery and particularly in upper abdominal lesions spinal anæsthesia is the undisputed anæsthetic of choice. Lahey[4] says "I am convinced from so much personal experience, particularly with spinal anæsthesia, (10,000 cases) that it has played a very great part in permitting us to accomplish some of the technical surgical procedures which we have performed".[4] He then cites complete and partial gastrectomies, resections of the jejunum and removal of common duct stones which he felt would have been difficult under other types of anæsthesia.

Graham and Brown[5] are equally enthusiastic: "The ability to carry out a careful atraumatic operative dissection in a difficult upper abdominal lesion reflects an advantage to the patient in several ways. An adequate operation can be carried out, thus ensuring to the greatest degree freedom from future trouble. Primary healing with a minimum of wound reaction takes place. Lesions questionably operable with inhalation anæsthesia can often be dealt with effectively." One might go on indefinitely multiplying testimonies in favour of subarachnoid block in intestinal obstruction, perforated ulcer, ruptured

viscus and other difficult intra-peritoneal operations until the bitterest antagonist will admit that contraindications are rare in abdominal surgery. Where shock, dehydration, hæmorrhage or debility from any cause presents itself, the experienced anæsthetist will prepare his patient for the spinal block by the display of intravenous therapy, blood transfusions and suitable analeptics. The moribund patient should not be subjected to a spinal anæsthetic. Minimum operative procedure under a local anæsthetic is indicated in such cases. "Failing spinal" in prolonged operations is now taken care of by the combined technique or continuous spinal.

Advanced cardio-vascular disease is a definite contraindication to high spinal anæsthesia. Vascular changes may be so great that the vasomotor nerves in the unaffected parts of the body cannot compensate quickly enough to offset the vaso-dilatation of the affected segments. This resulting fall in blood pressure may be sufficient to make insufficient the blood supply to an already impoverished myocardium, with disastrous results. Patients with an extremely low blood pressure should also receive every consideration before deciding to employ spinal block. Will they respond to vasoconstrictors? Is the myocardial reserve sufficient to withstand further lowering of the blood pressure? Is there a severe anæmia? Is the patient in shock or has there been a severe hæmorrhage? "In cardiac disease even in young patients the indications for spinal anæsthesia should be clear before this measure is undertaken. This is particularly true in those with regurgitant valvular lesions. Patients with decreased blood volume such as occurs in shock or dehydration from prolonged vomiting are to be considered unsuitable."[6]

Disease of the central nervous system such as intracranial tumours, cerebral hæmorrhage, tumours of the spinal cord and meningitis are definite contraindications in subarachnoid block. A positive history of syphilis should make one hesitant to employ spinal for if the disease has not already produced neurological changes, its tendency to do so will be embarrassing to the anæsthetist should they develop following the puncture. Carcinoma of the prostate with its possible rapid metastasis following operation may produce a paralysis that will be attributed to the lumbar puncture. Pernicious anæmia with its concomitant neurological changes presents a similar problem. A preanæsthetic explanation to the relatives of the possible sequelæ in these cases is advisable.

Septicæmia is a deterring factor to the use of spinal anæsthesia. The danger of producing inflammatory reaction in the central nervous system is obvious. Likewise, lumbar puncture should not be attempted in the presence of superficial or deep seated infection at or near the site of injection.

In patients with respiratory complications, subarachnoid block is especially indicated. Pulmonary tuberculosis, pneumonia, bronchiectasis, bronchitis, asthma and upper respiratory infections were a source of anxiety prior to the development of spinal technique to its present state of efficiency. Today it can be employed in these diseases with little fear of extension or exacerbation of the complicating malady.

Neff and Stiles[7] in comparing the three anæsthetic agents commonly used for patients with diabetes, found that the blood sugar was changed least, and the CO_2 combining power of the plasma was only fractionally reduced, under spinal block. Theoretically, spinal anæsthesia is the anæsthetic of choice for diabetic patients but the frequent coincidence of cardio-vascular degeneration with this disease necessitates consideration of the additional risk.

Organic changes in renal function are little affected by spinal anæsthesia. Hence it is the anæsthetic par excellence in kidney diseases.

The advantages of spinal anæsthesia to the new-born, in Cæsarean section, have been set forth by Heard,[8] who also prefers this type of anæsthesia in the best interest of the mother. His statistics of maternal complications, however, favour the gaseous anæsthetics. We personally prefer cyclopropane for this operation and, with the co-operation of the surgeon and a little patience on the part of the anæsthetist, sufficient relaxation can be obtained. In our hands spinal block for sections has been discouraging. There were two deaths from paralytic ileus and the high incidence of gastro-intestinal complications led to the discontinuance of this technique for Cæsarean operation.

In conclusion I would like to emphasize the necessity first, that spinal anæsthesia be entrusted only to those who through training and practical experience have made themselves proficient in its use, and second, that careful and constant observation of the anæsthetized patient be kept throughout the entire operation. Upon careful consideration of the effects of spinal

anæsthesia on the disease present, together with the urgency of relaxation to facilitate surgical manipulation, and upon the judgment and ability of the anæsthetist, must rest the decision whether spinal anæsthesia is or is not indicated.

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WHAT IS "COLITIS"?*

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THE use of the term colitis as a diagnosis is of comparatively recent origin. It is true that mucous colitis has been written about for years. If we examine Osler's Medicine, first edition, we find mucous colitis described as a rather rare malady occurring in nervous women. It was not until after the last war however that colitis began to be a popular diagnosis. In the boom years of 1927-29 the disease, or rather the diagnosis, reached epidemic proportions.

Undoubtedly the laity has become "colon conscious" in the last fifteen years, and it is not to be wondered at. The advertising of certain yeast companies has made it at once the most popular and potent organ of the body. Their collaborating European physicians have ascribed every skin condition except scabies to its disorder. The vendors of laxative pills, mineral oils, and various varieties of seeds have pictured its horrors. Milk companies have increased their profits by selling special brands of milk to change its poisonous bacterial flora.

This exploitation of the colon has led to the neglect by the medical profession of functional colonic disorders. Physicians hesitate to make the diagnosis, and, if they do so, make it in a half-hearted and apologetic manner as if it were a diagnosis that a regularly qualified physician should hesitate to make. In many ways the attitude of the profession with regard to functional colonic disorders has been similar to its attitude toward physiotherapy. It was only after the irregulars had demonstrated for years the benefits of manipulation and massage that the medical profession very gingerly began to use physiotherapy. The irregular has been among the leaders in the exploitation of the colon and he has been aided and abetted by the indifference of the medical profession toward the patient suffering from functional disease of the colon.

In this group of colonic functional disease, I wish to include the following conditions: colitis, spastic colitis, mucous colitis, spastic constipation, tonic hardening of the colon, irritable colon, unstable colon and colonic consciousness. I believe they should all be classed under either of the last two names, unstable colon or colonic consciousness, because they all represent different phases of the same underlying condition; a disturbance in the neuro-muscular or neuro-glandular control of the large bowel. As in all functional conditions, the fault does not lie primarily in the organ producing the symptoms, but in the unstable nervous condition of the individual.

The number of names associated with this condition at once suggests that its signs and symptoms are many and varied. When constipation is the main symptom, the term spastic constipation is usually applied. It differs from ordinary constipation in its inconstancy. The ordinary dietary measures prescribed for constipation will work very well for a time and then suddenly without any change of regimen the patient's bowels will refuse to move. If they do move with difficulty, the patient will often tell you that the stools are small and ribbon-like. On going into the history you will usually find a story of some increased stress or strain coincident with the refusal of the bowels to act. In the treatment an effort should be made to restrain the abuse of laxatives. During the period of spasticity it is preferable to use

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mineral oil, and between periods only dietetic measures. The patient should be educated as to why he is constipated at these times. If possible the environment responsible for the spasticity should be improved. If the particular stress cannot be removed something can be done temporarily by the use of sedatives. In these cases a bromide may be our best laxative. An example of this type of colonic disturbance was a woman who came in complaining of marked constipation. The ordinary dietetic measures were carried out, and for several weeks her bowels moved fairly well. Then she got into difficulties again. With the addition of a sedative she was successful in handling the situation, but as soon as the sedative was removed the trouble recurred. The particular emotional stress in this case was a difficult husband. She was advised to go on a holiday and forget both the husband and her bowels. While on vacation she had no trouble on an ordinary diet. Of course when she returned to her troublesome situation her constipation recurred, but at least she understood the reason, and was convinced she had nothing organically wrong and was able to deal with the situation more intelligently.

When the main symptom is some form of diarrhœa the term colitis is usually applied. The patient either has loose bowel movements persistently, or, what is more common, has periods of loose stools interspersed with periods of normal bowel movements. Again, we have a disturbance of the neuro-muscular control but with the emphasis on hyperperistalsis rather than spasticity. This is the type which is also frequently diagnosed as irritable colon. A typical example of this type was a young man whose bowels became loose due to worry over the serious illness of his wife. The period of worry only lasted two weeks, but the chronic diarrhœa had persisted for a year when he came in for treatment.

The next type we shall consider is the so-called mucous colitis, one of the most popular of the many diagnosis of colonic disturbances. In this condition the chief fault lies in the neuro-glandular control, although there almost always is an associated upset in the muscular control as well. It is characterized by the passage of large quantities of mucus at stool. Indeed sometimes the stool consists of nothing but mucus. Usually the passages of mucus are preceded or accompanied by cramps and looseness of the bowel. It almost always occurs with periods of normal bowel movements intervening. An example of this type is a lady whose husband got into trouble with the law and deserted her. Under this initial stress, looseness of the bowels and the passage of mucous stools appeared. Every few months since, during some extra emotional strain, she has attacks characterized by severe cramps, almost completely mucous stools, and an urgency so great that when the call came she frequently was unable to reach the toilet in time.

In addition to the type already discussed, we have a much larger group that is not so easily recognized. The symptoms are very diverse in character. Practically every such patient complains of gas, either belching or distension. The great majority have abdominal distress in some form. It may be distress in the epigastrium which is relieved by antacids, or it may be lower abdominal in type and relieved by passing gas or bowel movement. Any lower abdominal distress which is improved by passing gas or by a bowel movement is indicative of colonic dysfunction. The pain is frequently shifting in character and the patient has difficulty in accurately localizing and describing it. A few have nausea and vomiting. Other common general symptoms are headache, loss of energy, dizziness and nervousness. Pain which wakens the patient at night is frequently felt. The night pain of peptic ulcer usually comes between 12 a.m. and 2 a.m.; that of colonic disease early in the morning.

The commonest combination of symptoms is dyspepsia, lower abdominal distress, bloating, and loss of appetite. Physical examination does not give many valuable signs but is chiefly important in ruling out organic disease. There frequently is tenderness over the lower quadrant of the abdomen. Sometimes the colon can be palpated as a tender spastic sausage-like mass in the left lower quadrant.

The diagnosis of unstable colon should never be made until exhaustive examination has ruled out organic disease. The stools should be examined for parasites, amœbæ, and organisms of the dysentery group. The amount of mucus should be noted and tests made for occult blood. Sigmoidoscopic examination should be done to rule out ulcerative conditions, polyps and malignant growths. The x-ray is of great value in the diagnosis. It is valuable in ruling out organic disease and it also gives evidence of a positive nature. The most important signs as-

sociated with the barium enema are (1) crampy pain or filling; (2) marked changes in the rate of filling; (3) areas of spastic contraction.

Functional colonic disease may simulate very closely some of the common organic gastro-intestinal diseases. The over-wrought woman complaining of dyspepsia, belching and bloating, and who is tender in the upper quadrant of her abdomen, may be a case of cholecystitis but she may also have a functional colon. The nervous young man or woman with indigestion, lower abdominal distress, and tenderness in the right lower quadrant, may occasionally have trouble in the appendix, but this is much more likely to be functional, and every year we see fewer lose their appendices for so-called chronic appendicitis. Much less common is the case which mimics peptic ulcer almost exactly. I have several cases of colonic functional disease in which I would defy anyone taking the history not to make a tentative diagnosis of duodenal ulcer. To give you an example. This man came in giving a history of epigastric distress, coming two to three hours after meals, relieved by food and soda. It came in periods lasting a few weeks and had been coming intermittently for twelve years. He refused x-ray examination because of the expense. A tentative diagnosis of duodenal ulcer was made and he was placed on ulcer management. He got along very well for a couple of weeks and then began to have trouble. To me this always means that either the patient does not have an ulcer, or has a surgical complication. I insisted on x-ray examination, which showed a perfectly normal stomach and duodenum but a markedly spastic colon. He was placed on colonic management and rapidly lost all his distress.

In the treatment of this condition, as in all functional conditions, thorough examination of the patient constitutes one of our most important therapeutic procedures. It gains their confidence and they are willing to listen, and believe when you tell them they have nothing organically wrong. The difference between organic and functional disease should be carefully explained. They should be assured that you consider their symptoms are real and not imaginary. Too often in the past they have been given a slap on the back and told that they had nothing the matter with them and to go home and forget about it. The result was that they drifted into the hands of the irregular, or, what was worse, into the hands of some operator who relieved them of some innocent part of their anatomy. Thousands of these people have lost their appendices, gall bladders or pelvic organs. I have one who even had a gastro-enterostomy. These patients are poor subjects for legitimate surgery, but when they are operated on for the relief of functional symptoms the results are deplorable.

An attempt should be made to change the conditions which are responsible for the patient's symptoms. If they are working too long hours, not taking vacations or burning the candle at both ends in other ways, they should have the error pointed out. If they are unhappy in their work an attempt should be made to find more suitable occupation. They should be taught the value of relaxation. Plenty of sleep and a mid-day rest period are important. Two vacations a year are better than one if they can be obtained. The successful results of sanitarium treatment are due to the fact that the patient is on holiday rather than the many things which are done to his colon.

Too often the particular stress or strain under which the patient is living can not be eliminated and we have to try to teach them to live with their disease. The diet should be bland, but high in calories and vitamins, as many of these patients are under weight due to a self-restricted regimen. Restricting the patient from drinking with his meals and for two hours after will cut down on gas and bloating and make him chew his food more thoroughly. Ice cold liquids should never be taken. Food allergy may be the important factor in the occasional case and the offending foods should be searched for and eliminated. I have two patients with marked intolerance to cow's milk. Sedatives are of great value during exacerbations but should not be used over long periods. The patient should be seen regularly and given encouragement, for they lose faith easily and tend to turn to other schools of therapy that advertise quick results and pleasant methods of treatment. When they are free of symptoms they should be warned that they are not cured but that their symptoms will return if they have sufficient emotional disturbance.

ACUTE EMPYEMA*

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ACUTE empyema is a condition with which each of us has undoubtedly at some time had close distressing first-hand contact and against which we are each probably well forearmed. Yet since the condition is one that is noted as a camp follower of armies and an ally of social distress, it may, unhappily, be opportune to review the matter and consolidate our information at this present time.

Empyema is a collection of pus in the pleural cavity. Bacteriologically and etiologically there are three types: (1) pneumococcic, associated with lobar pneumonia; (2) streptococcic due to *S. hæmolyticus* and associated with the pneumonias of scarlet fever, influenza, and measles; with blood borne infections from tonsils, mastoids, etc., and with the direct infection of chest wounds from without; (3) *B. coli,* due to the colon bacillus and arising in association with the peritonitis of suppurative appendicitis, perforated peptic ulcer, abscess of the liver, subphrenic abscess and suppurative pelvic disease.

Infection may reach the pleural space by rupture of a lung abscess, by the blood stream, by the lymphatics or by introduction from without.

When a pneumonia is the underlying factor infection reaches the pleura through rupture of a localized lung abscess, often minute. This abscess is usually found on the convexity of the lung, sub-pleural, but it may be mediastinal. This statement definitely holds for all cases of streptococcal empyema but Boyd states that though it may hold for some of the pneumococcic type it is difficult to say at present whether it holds for the majority of them. An alternative route is through the lymphatics of the outer margin of the lung which drain directly into the pleural space.

In blood borne infections empyema may have all the appearances of a primary infection but on closer investigation can usually be traced to a parent focus. The type arising in the course of scarlet fever, measles and influenza is believed to reach the pleural space through the medium of a pneumonia either recognized or overlooked. The type due to *B. coli* and associated with intraperitoneal suppuration is classified by Boyd as being blood-borne but I favour the teaching that it is carried to the mediastinum by the lymphatics draining the paracolic gutter, producing a mediastinal lymph adenitis and so a pleuritis.

Pathologically, empyemas fall into two great types: the pneumococcic and the streptococcic. These are distinct in all features, one from the other, and because of their fundamental differences in type are definitely distinct from each other in fundamental principles of treatment.

Acute pneumococcic empyema develops comparatively late in the course of acute lobar pneumonia, usually becoming evident after crisis has been reached and resolution has begun. It is diffuse and purulent in character. It is slow to organize and form adhesions. It does not produce membranous thickening of either parietal or visceral pleura. At the time of its onset, since the pneumonic process is subsiding and resolution is well advanced, the vital capacity of the lung is approaching normal. Dyspnœa, cyanosis are less marked. Temperature, pulse and respirations are greatly reduced, if not normal. The pneumonia and its immediate risks have been passed. There is then added a purulent effusion into a pleural cavity as a complicating sequel in a lung field no longer acutely involved.

Early, open, free drainage on diagnosis has long been accepted as standard and successful treatment. Open drainage means the immediate establishment of an open pneumothorax. Fear of collapse is no contraindication. The lung on the affected side has already mostly regained its vital capacity. Relieved from fluid pressure by drainage it rapidly expands and fills its normal place in the thorax. Free, open drainage on diagnosis has met with little sane opposition and I think it has always been sound surgical opinion that the freer the drainage opening within reason, the more gratifying the results. Persistent cavities calling for special

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care following pneumococcic empyema are rare. Special lung exercises at times may be helpful, but on the whole the cavity tends to sterilize itself by drainage and on sterilization to obliterate itself, the lung unrestricted by adhesions returning to its normal place in the thorax.

Intercostal drainage, type of tube, and type of anæsthetic have been debated points. Intercostal drainage is apt to defeat its intended purpose, for it is apt to be neither free nor open at times. The ribs have a tendency even in the erect posture to close down on each other from above downwards, thus tending to pinch off an intercostal tube and interrupt drainage. Further, only a comparatively small tube can be accommodated in the intercostal space. Intercostal drainage may very easily be classified as inadequate. Little of essential significance is to be said of the type of tube except that it must be adapted to secure fixation in the chest wall and must be large enough. These requirements being satisfied, any tube is a right tube. The type of anæsthetic is a matter of consideration but I prefer to resolve the point this way: any general anæsthetic, properly given after proper premedication, is a good anæsthetic.

In handling volunteers for service since the outbreak of this war I have come across a few young men bearing scars of rib resections for pneumococcic empyema. In no instance have I found a case showing any functional impairment of the thoracic wall nor a lung showing any recognizable clinical disability. Further, all cases referred to were radiographically acceptable for service. I have reason to believe this condition is quite general. Rib resection for early drainage, drainage on diagnosis, of pneumococcic empyema is accepted as standard treatment. Its death rate is low. Its morbidity is low. On the whole the condition once treatment is instituted gives little cause for real worry.

In streptococcic infections, on the other hand, the effusion develops early in the course of the pneumonic process and may even sometimes be present before the pneumonia is manifest. At first the effusion is serous in character changing to sero-fibrinous and later becoming purulent. It develops and undergoes its characteristic changes while at the same time a streptococcal involvement of the lung is taking place.

Together the pneumonia and the effusion combine to form a single clinical picture. The parenchyma of the lung is fixed by engorgement, its bronchioles are plugged with a thick fibrinous exudate and multiple small abscesses form. Intrathoracic pressure is increased by the effusion, the mediastinum is pushed over, the lung root distorted and circulation embarrassed until, as MacCallum states: "The patient suffers from dyspnœa of the most extreme type especially during inspiration, producing a livid cyanosis. Many of the patients become hoarse or lose their voice entirely. They are alert, apprehensive, sleepless and there is often delirium."

As the process continues to develop, the effusion becomes more fibrinous and frankly purulent. Exudate is deposited on both pleural surfaces and in the mediastinum, thickening and tending to render these structures rigid. Adhesions develop between the pleural layers confining the effusions now frankly purulent in pools. The visceral pleura becomes still more markedly thickened, compressing the lung and rendering it fixed as if held by a corset. Fixation of the mediastinum as the exudate becomes fibrinous takes place.

Purulence is a late characteristic of the exudate. The appearance of pus in the effusion and the recession of the acute pneumonic process are thought to synchronize and thus for practical purposes the demonstration of one may be taken as a guide to the presence of the other, that is, on demonstration of pus by diagnostic puncture it may be taken that membranous adhesions have formed and the pneumonia has passed its peak, for, clinically, with the demonstration of pus there is at the same time noted a definite improvement in the general condition of the patient.

When the principle of free, early and open drainage was applied to the treatment of streptococcal empyema the results were disastrous. But it was not until the chest wounds of the Great War and the influenzal empyemas of the 1918 epidemic were so treated that the magnitude of the disaster became evident and an attempt made to find a rational basic cause for failure. The work of this period that seems to be of most value and to have been given the greatest recognition was by Evart Graham, Professor of Surgery of the Washington University, School of Medicine. This work is widely quoted

and more or less summarized by Boyd in his chapter on empyema.

In his essay Graham lays down three principles for the treatment of streptococcal empyema: (1) Careful avoidance of open pneumothorax in the acute stage. (2) The prevention of chronic empyema by the rapid obliteration and sterilization of the infected cavity. (3) Careful attention to the nutritional requirements of the patient.

Graham's principles are based on the experimental work of himself and his associates on the effect of an open pneumothorax on the lung and mediastinum.

By an open pneumothorax is meant a condition in which there is free entrance and exit of air into a pleural cavity through an opening in the chest wall. The older concept of the physiological effect of an open pneumothorax was based on the wrong idea that the mediastinum was normally a rigid partition separating the thorax into two walled-off compartments. It was therefore thought that an open pneumothorax would immediately establish atmospheric pressure within the pleura opened and collapse the lung on that side, putting it at rest, while the lung on the opposite side would be undisturbed in its normal function. Because of this concept early, open drainage of streptococcal empyemas was considered the correct though hazardous procedure.

Graham demonstrated that in the normal thorax the mediastinal structures offer so little resistance to changes in pressure that any slight change of pressure in one pleural cavity affects the other pleural cavity to practically the same extent, and that so far as moderate changes in pressure are concerned the normal thorax can be considered as one pleural cavity instead of two.

When one pleural cavity is subjected to so slight a pressure as that of 10 cm. of water the pressure in the other pleural cavity is found to register from 8 to 9.5 cm. Therefore the mediastinum offers to this slight pressure only the resistance of from 0.5 to 2 cm., or in terms of mercury a resistance of 0.4 to 1.6 mm. In other words the resistance of the normal mediastinum is so little to slight pressure that it must be concluded to be negligible to any great pressure such as a diffuse effusion or atmospheric pressure acting through an open pneumothorax.

Applying these observations to the treatment of streptococcal empyemas we find that if one waits until frank pus is demonstrable the acute process has subsided and organized exudate has so fixed the mediastinum and splinted the lung that an open pneumothorax for free drainage is not only entirely safe but definitely indicated. Graham states that the main purpose in treating streptococcal empyema is to drain and that any method which falls short of free drainage is inadequate. During the acute phase of the disease relief from respiratory embarrassment may be had by early aspiration repeated as indicated. Early aspiration to relieve pressure is physiologically sound treatment. No air is introduced, fluid is withdrawn relieving cardiac embarrassment and increasing ventilation in the sound lung.

The principle of drainage, then, in streptococcal empyemas is thus reduced to the same time factor as has been considered safe in dealing with the pneumococcic type. Drain when frank pus is demonstrated, that is, when the acute underlying process has subsided. At this time, in these cases the lung, well supported by adhesions, is well protected against a disastrous bilateral collapse.

If drainage in streptococcal cases is unduly delayed following the demonstration of satisfactory indications, chronicity is apt to be encountered. Empyemic cavities of the streptococcal type tend to become chronic of their very nature, and, improperly cared for, are the source of much discouraging morbidity. They are cavities walled off laterally by a firm thickened parietal pleura, by tough vascularized adhesions above and below and medially by a dense visceral pleura which firmly splints the lung and allows of no respiratory excursion. To palpate such a lung in life gives the impression of palpating a cirrhotic liver. These cavities do not tend to obliterate themselves. The underlying lung is fibrosed, the visceral pleura is inelastic. It is clear that the longer the exudate is allowed to remain on the lung, the longer it will take to obliterate the cavity.

With appropriate early care the removal of exudate from the pleural surfaces may be accomplished without the hazardous and unsatisfactory decortication operations of Fowler and Delorme first described in 1893. In the same way closure of the cavity may be obtained without recourse to the destructive, obliterating operations of Estlander and Skede. Please note I am dealing only with acute empyema.

Graham states that sterilization of the cavity, mobilization of the lung and obliteration of the cavity may be simultaneously accomplished by the early and consistent use of Dakin's solution. The strength used is 0.5 per cent. The method is instillation, not irrigation. The fluid content of the cavity is first measured. With the patient prone on the well side 0.5 per cent Dakin's solution is then gently instilled into the cavity in quantities slightly less than its measured capacity. The patient is kept so postured for a short while then turned and the fluid decanted. The procedure is repeated at first every three hours during the day. Shortly, shreds of exfoliated exudate are noted in the drainage and later during instillation respiratory movement in the lung becomes evident. As the cavity decreases in size less solution will be used and I believe it may safely be used less frequently. As the lung becomes mobilized it finds its normal place in the thorax and healing proceeds to completion as in the pneumonic type.

Ordinary surgical dressings are used. Flap valves, blow bottles, closed drainage, intercostal catheter drainage, together with Fowler's operation and the Estlander are entirely removed from the picture. By the proper timing of our rib resection for drainage and by the early proper and consistent use of Dakin's solution a high mortality rate and much morbidity are avoided and the entire picture cleared of most of its worrisome features.

I have found but scant information in standard reference works dealing with the *B. coli* type of effusion. I have already described its etiology in suppurative peritonitis. The spread is by the lymphatics to the mediastinum. I have seen three such cases, two arising from suppurative appendicitis and one from suppurative pelvic disease. All three were right-sided, an observation which may be taken to bear out the lymphatic theory since the abdominal lymphatics enter the thorax to the right of the vertebræ and are more in relation to the right chest. All three cases developed late in the course of the peritonitis, two cases so late that they had been returned home to complete their necessary post-operative bed rest and were readmitted with empyema diagnosed. The third case developed in hospital some eighteen days after his appendix operation. No case showed any demonstrable pneumonia. One patient survived and that only after at least two blood transfusions. The other cases were done at a time when whole blood was not so well appreciated and available. The survivor experienced no particular difficulty in accomplishing satisfactory healing. My impression of these *B. coli* empyemata is that the rule applied to the pneumococcic type is applicable to them. Open on diagnosis: the lung is able to care for itself. These cases are of course poor operative risks because of the long siege of suppuration they have already withstood. Yet, with the advantages of modern supporting treatment I believe their mortality can be improved.

Graham speaks of safeguarding the nutritional requirements of the patient. I believe our modern ideas have been greatly amplified since his work was done in 1918. The big loss in body resources in these cases is in the nitrogen group. High caloric feedings as in typhoid, copious fluids, glucose intravenously and whole blood are each supporting measures, none of which should be overlooked.

The sulfanilamides of course have been recently added to the picture. What eventual rôle they are to play in the picture is not yet clearly indicated, but there are already sufficient grounds for the suggestion that acute conditions associated with a pleural effusion that have recovered under sulfanilamide therapy should be observed for a period lest recovery be only a quiescence and pus develop later.

SUMMARY

There are two outstanding types of acute empyema: (1) pneumococcic; (2) streptococcic. These differ from each other radically in their pathological tendencies and in their therapeutic requirements.

In the pneumococcal and *B. coli* types: drain by rib resection on diagnosis. In the streptococcal type: aspirate early; drain on demonstration of pus; disinfect the cavity.

SHOULDER PAIN*

BY H. F. MOSELEY

Montreal

PAIN is the characteristic feature referred to in cases in this series—pain without radiological evidence of fracture, dislocation or gross organic disease. This communication is based on a sequence of 158 cases during the past five years.

TABLE I.
PAINFUL SHOULDER LESIONS

Montreal	80 cases
London	78 "
Total	158 "

Diagnosis	*Montreal*	*London*
Complete rupture	4	3
Partial ruptures:		
Recent	9	30
Old	13	3
Tendinitis, "Frozen shoulder"	13	..
Calcified deposit	17	..
Bands, villi	7	..
Various	17	..

I will confine myself to three groups of cases: (*a*) subacromial bursitis; (*b*) calcified deposits; (*c*) rupture of the short rotator cuff.

Subacromial bursitis.—The subacromial bursa is situated above the gleno-humeral joint; its base rests on the upper end of the humerus, partially covered by the short rotator cuff and its roof is overlapped by the acromio-clavicular arch with the attached deltoid muscle. The knowledge of the function and lesions of this bursa constitutes the key to the painful shoulder. In order to recognize the limitations of movements in these cases, an analysis of the shoulder mechanism must be considered.

In the normal person, abduction of the arm to a right angle occurs chiefly at the gleno-humeral joint; abduction beyond this point, however, is a more complicated problem. One factor is certain, *i.e.*, further abduction can only occur with external rotation of the humerus on its long axis, and this rotation requires the normal function of the subacromial bursa. Further, any degree of interference with the bursal surfaces by adhesions will limit this rotation and proportionally the abduction beyond 90 degrees.

Many factors possibly play a part in producing lesions in this bursa. The important one is trauma. The wear and tear of daily use is associated with the degenerative process of passing years. Whether metabolic disorders, focal sepsis, and toxic absorption also play a part is not clearly understood.

Whether acute trauma may give rise to a form of Sudeck's atrophy of the shoulder region and thus account for cases of "frozen shoulder", has for some time been under consideration.

Lesions of the bursa do not occur alone. Such are usually associated with changes in the underlying rotator tendons and the joint capsule. In fact, the late Dr. Codman believed that most processes in the bursa are secondary to tendinitis, and my own operative observations agree with this view.

In the partial ruptures of the supraspinatus with adherent bursitis there is a contracture of the short rotator muscles and indeed also of such adductors as teres major and pectoralis major. This we see in the adducted shoulder with limited abduction characteristic of these cases when neglected. From the contracture of the muscles follows the highly placed humeral head, which position may also account for the restriction of abduction.

Further, in bursitis associated with calcified deposits, there is no doubt whatsoever that the calcification is initially in the tendons and only secondarily erodes the bursal floor. If this deposit recurrently irritates the bursa or breaks into it an adhesive bursitis develops from chemical irritation. In fact it is my belief that many cases of adherent bursitis have this origin.

Studies in referred pain.—It is necessary at this point to mention the recent work on referred pain from fasciæ, ligaments, bursæ, periosteum and other mesodermal tissues. This has been published by Lewis and Kellgren, who have shown that these structures when irritated will give rise to a pain referred at some distance from the trigger zone. The method used has been the injection of small quantities of hypertonic saline into an area. Thus areas in the low back or

* From the Department of Surgery, Royal Victoria Hospital.

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gluteal region on injection will give a sciatic radiation. The writer has used this method of investigation around the shoulder and elbow. Injection of 0.5 c.c. 5 per cent saline into the area of the supraspinatus insertion will give pain referred to the insertion of the deltoid, and in larger amounts, the pain will pass to the elbow, forearm and even fingers. Further, in operations in calcified deposits carried out under local anæsthesia, pressure on the deposit through the base of the bursa will give excruciating pain down the arm, elbow, forearm and fingers, and also up the trapezius to the occipital region. In fact typical "brachial neuritis" is produced. This of course, is only true in cases where the bursal floor is acutely inflamed from irritation by the deposit.

Symptoms.—A knowledge of the above studies enables one to understand the pain in cases of bursitis. In the acute cases the pain is all around the shoulder and may radiate, as stated above, to the occipital region and down the whole extremity to the fingers, which feel swollen and stiff. If the process comes on gradually the pain is first felt around the shoulder, then as the process extends, the pain is referred more and more distally. Further, as the bursitis subsides, the referred pain retraces the steps, and in the chronic cases, localizes at the deltoid insertion. As we will see later, the understanding of this is of interest in treatment.

The pain may be so severe that heavy doses of morphia have little effect, and is characteristically worst at night.

Signs.—The physical signs depend on the intensity and stage of the bursitis. The range of movement at the glenohumeral and subacromial areas varies from zero in the completely "frozen" shoulder to almost complete movement in patients with mild bursitis. In the severe cases, marked atrophy of the deltoid and scapular muscles is present. The joint capsule may be diffusely tender on palpation.

Radiology.—The films usually show a decalcification of varying degree most marked in the greater tuberosity. Small, degenerative, cyst formations may be present in the subcortical bone. The head of the humerus is held high in the glenoid in the severe cases. Depending on classification, approximately 50 per cent of cases with symptoms and signs of subacromial bursitis will show evidence of calcified deposits.

Treatment.—There is certainly no agreement on a single method of treatment for subacromial bursitis without calcification. Each specialist publishes excellent results with the methods at his disposal, whether diathermy, x-ray, iontophoresis, manipulation, splinting, surgical excision or puncture, and so forth. The fact that so many methods appear to give good results must mean that a common denominator is present. This denominator is the time factor associated with the natural tendency of healing, the *vis medicatrix naturæ* of the ancients, which is inherent in the living tissues. The part of the physician is to assist nature in this process, at least not to interfere adversely. The indicator of the effect of treatment is change in the clinical state, above all, in the symptom of pain.

In a previous paragraph, a short digression was made on this subject, and it was pointed out how the pain began around the shoulder and spread along the deltoid to its insertion, then farther down the arm, especially on its outer side and into the forearm and hand, and also how this radiation was retraced as the bursitis subsided and was last centred at the deltoid insertion. Now it was axiomatic among the English bonesetters, among whom there was a great deal of common sense, that the painful shoulder should not be manipulated until the pain finally localized at the deltoid insertion. Until this time the principle of treatment was rest, with such adjuvants as heat and sedatives, after which the principle of treatment was movement. If the movement caused an increase of the pain as regards intensity and radiation, the movement had been instituted too soon, and a further period of rest was enjoined. This has been formulated into a test by the greatest of English bonesetters, Hugh Owen Thomas, and is called Thomas' Test of Recovery. This has been my guide in the treatment of these most difficult cases, and I sincerely commend it to your consideration.

In the approach to these cases, including those in the acute stage, the speaker makes use of the therapeutic test of movement. This is carried out usually after a thorough injection of the bursal area with 50 to 60 c.c. of 0.5 to 1 per cent novocaine, followed by manipulation of the shoulder if possible throughout its full range, and followed again by 20 minutes' diathermy. In some of the worst cases who have suffered intensely with lack of sleep, one single treatment has given sufficient relief to make sleep possible. I can recall no case aggravated by this treatment, and have therefore made it the basis of my

therapy. This is associated with all forms of heat, of which the electric pad used continuously at its lowest temperature, has proved the most efficacious. Massage, faradism to wasted muscles, and resistance exercises are also employed. Splints and slings are rarely used, but drugs such as aspirin are ordered as indicated. In the completely frozen shoulder, treatment over six weeks is usually required and the writer endeavours that the initial seven to ten days will be spent in the hospital so that the patient learns method and co-operation.

In concluding this section, I would emphasize that here certainly is a field where a thorough practical knowledge of the methods of manipulative surgery makes the difference between success and failure.

Calcified deposits of the rotator cuffs.—The rotator cuff is the most common site in the locomotor apparatus for the deposition of amorphous calcium. The chemical nature of the deposit has been analyzed for me by Dr. J. F. MacIntosh, and consists of calcium carbonate and phosphate. The deposit is radiologically localized in one area of varying size, but at operation it is obvious that the tendons are diffusely involved and are on the whole in a degenerating state.

At operation it is seen that the deposit areas are frequently multiloculated, which must mitigate against the successful evacuation by needling. In the chronic state, there may be little evidence of the deposit on exposing the base of the bursa. On incising the deposit, it is found to be inspissated and difficult to remove without removing parts of the tendinous tissue. In the acute state, the base of the bursa is congested and even hæmorrhagic and œdematous with fibrinous adhesions. On incision the deposit exudes with force as if under tension. It is much more fluid than in the chronic stage, and has the appearance of tooth paste.

In some cases the bursa itself is full of a milky fluid which is due to a rupture of the material into the lumen and subsequent chemical bursitis with exudation to dilute the irritant.

There is no accepted view on the reason for this calcium deposit. In hospital practice, it is obvious that the deposits are much more common in women than men, in those of sedentary type, as compared with the active type, in those tending to obesity, and especially among diabetics and amongst the Jewish and Southeast European races.

The deposits are best visualized if a soft tissue film is taken and if the films are of an anteroposterior view with the shoulder in first internal rotation and then external rotation. The shadow may not show if this routine is altered. The statements made in the previous section on subacromial bursitis and dealing with the symptoms, signs, and conservative treatment are equally true here.

There is, however, the question of operative intervention and it is the speaker's intention to confine himself to this particular point.

Position of surgery in the treatment of calcified deposits.—Most cases of calcified deposits will disappear completely under a course of three to six weeks' diathermy, associated with intensive pulley exercises. There will be a tendency to recurrence in the same or opposite shoulder.

However, any person, lay or medical, who has seen a patient with fulminating symptoms at the end of a week of sleepless nights, and who has seen the immediate relief given by an evacuation under local or gas anæsthesia, will agree to the value of open operation in such cases. It is readily carried out and is always most successful in relieving symptoms. Evacuation can also be used in chronic cases with large deposits which have failed to disappear, or in which the symptoms have been aggravated by radiation therapy.

The speaker has found the operative treatment of these cases most successful, and this agrees with the opinions of Dr. Codman and Dr. Bosworth. Six cases operated upon during the past two years have been checked and found free of recurrence, whereas the majority of cases treated conservatively and who have been traced are improved, but have had recurrences.

Ruptures of the short rotator cuff.—This group includes every degree of severity from minor rents, to cases of complete detachment of the rotator cuff.

The clinical picture is that of a patient in middle life, who, after a strain from lifting, or from a fall, feels a snap in the shoulder accompanied by severe pain and followed by muscle spasm. Six to twelve hours later the pain is most intense, and the patient fails to sleep.

On examination, at this stage, one notes that the shoulder is held stiffly by the side, and any attempt at movement, especially in abduction, gives rise to pain and increased muscle spasm. In mild cases, abduction to 70 degrees may be possible without pain, but as the area of the

lesion passes under the coraco-acromial ligament, severe pain is felt which disappears at 110 degrees, to return over the same range in adduction. This is obscured by the altered scapulo-humeral rhythm. Rotation likewise is prevented by spasm. The area of the lesion is tender and there may be pain referred to the insertion of the deltoid. Radiology discloses a highly placed humeral head, but is otherwise negative.

The full movements can be carried out, however, by the injection of novocaine into the tender area, or by preventing its impingement on the coraco-acromial ligament by the relaxed muscle position or "the depression of the head test".

The intensity of the symptoms varies with the extent of rupture. It is less marked in the aged.

The surgeon's most difficult task is the selection of cases requiring operation. In this respect practical experience in the treatment of a large number of cases develops judgment. In my experience, it is best to operate in cases of doubt, as cases of complete rupture without operation usually end in stiff, weak and painful joints.

The value of novocaine both as a diagnostic and therapeutic agent cannot be overestimated. It has been used in this series from the first, and the ideas for its use were gained from the work on sprains by Professor Leriche.

In the partial ruptures, novocaine infiltrated into the affected area will restore full painless movements with disappearance of the muscle spasm. Furthermore, in the majority of cases, the pain is permanently lost to the extent of 30 to 60 per cent of its original intensity and in some, the one injection removes the pain permanently and entirely.

In the complete ruptures, novocaine injection will often again relieve all pain and muscular spasm. The movements will reappear, and will be full in extent under voluntary control. Some gentle massage or manipulation may be necessary before this is achieved. In these cases however, there is marked weakness in maintaining abduction against any resistance, or the arm when abducted may just fall to the side. This is the "drop arm sign" for severe ruptures of the rotator cuff.

I decide on exploration if there are the clinical features of a severe injury with negative radiology, and where there is marked weakness in maintaining abduction after novocaine.

Untreated, the mild cases gradually improve. In the more severe cases the muscles pass from a state of spasm to contracture, and the head of the humerus is held high in the glenoid and in adduction. An adherent subacromial bursitis organizes from the tearing of its base. The result is a shoulder in which abduction and rotation are greatly limited and this loss of movement is obscured by the movements of the scapula.

The treatment of these cases by strapping, Velpeau bandage or the sling position, which constitutes the routine medical procedure, predisposes to the poor result.

TREATMENT

Recent partial ruptures. — In recent partial ruptures, the treatment has been immediate full range of movement carried out by the relaxed muscle position or by manipulative means with the use of massage, novocaine and diathermy for pain. The time required for complete relief in a good subject, is roughly 3 weeks, but in the series of 30 cases previously published including cases of compensation neurosis, the time factor was seven and one-half weeks.

Old partial ruptures of the short rotators.— The principle of treatment here is movement. Heat, massage, faradism, novocaine to the scarred area, and stretching even with gas anæsthesia will restore the majority of these cases to normal. The time factor for these cases however is usually about three months, although the clinic cases usually discharge themselves before this time.

Recent complete ruptures.—In the complete ruptures the principle of treatment is accurate suture at the earliest moment, followed by rest for 3 weeks. Then active movements gently restored with heat, massage and faradism to the shoulder muscles. In the two cases of complete rupture of the supraspinatus operated on within a week of the accident, the results were perfect. In the one case of complete rupture of the rotator cuff operated on within a week, the result was good, but the patient was unable to do heavy work.

Bosworth states these latter cases are best treated by arthrodesis of the shoulder, but I have not been convinced on this point.

In the cases of complete rupture where suture has not been possible, shoulder function can be secured as satisfactorily as late suture

results, if early movements and strengthening exercises are carried out under careful supervision. In this group we have two cases with 70 to 80 per cent function of the shoulder. Both these cases, however, are in the 70 year age group, and such results are not adequate in the young patients.

Old complete ruptures.—The question for decision here is whether the age, general health and economic position of the patient justifies interference.

In cases where operation is justifiable, a shoulder with three-quarters to seven-eighths of its function can be secured. This is shown in a case operated upon three months after the accident and previously published, and also by a case seen with Dr. Magee in Peterborough, sutured one month after the accident.

The time required after operation to secure good function is again about six months, with further improvement after this period.

SUMMARY AND CONCLUSIONS

Shoulder pain is a symptom of many local and distal lesions.

The key to the painful shoulder is in understanding the importance of the subacromial bursa.

Many, if not most, cases of brachial neuritis have their origin in the bursal area.

The work of Lewis and Kellgren on referred pain has been applied to the painful shoulder.

The relative positions of rest and movement have been stated as clearly as possible.

The value of Leriche's work on soft part injuries with immediate movement after novocaine, has been corroborated in diagnosis and therapy of shoulder lesions.

The principle of movement constitutes the key to therapy in the shoulder disorders under discussion.

THE RÔLE OF THE PATHOLOGIST*

BY WILLIAM J. DEADMAN

Hamilton, Ont.

TO the individual keenly alive to his human environment nothing is more fascinating than the study of history. In spite of the opinion attributed some years ago to an internationally known industrialist, history is not "bunk". "Humanity with all its fears, with all its hope of future years, is hanging breathless on the fate" of the British Empire, and indeed on that of the whole Anglo-Saxon system of civilization. Humanity, when the present critical struggle shall have been resolved in favour of those who cling to Anglo-Saxon ideas of liberty, will need in the future to pay considerably more attention to the lessons of history than has been the case in the past, or than Canadians have paid during the last twenty years. Reason, the power of deduction, and the ability to base future conduct on the past experiences of himself and of others are presumed to be prerogatives of the human being; unfortunately, they appear to be exercised by the minority rather than by the majority. Man is biologically an animal; human nature is fundamentally selfish; and self-interest, immediate or sublimated, underlies most if not all human actions, individual or collective. So long as human beings remain human, it must inevitably be so.

Reason would teach us that, if we are to predict the future course of human events with any degree of accuracy, if we are to safeguard intelligently our own future and that of those who follow us, we must base such predictions and the actions which they dictate, on a knowledge of what the human being has been doing over the past 7,000 years of recorded history. Human nature has changed little, if at all, over that period; the technique of human reactions alone has changed. Over the past 1,900 years, it is difficult to be convinced that the principles of Christianity have been adopted to the point of banishing the old Adam, or that the practical application of the fundamental principle of Christian doctrine, the raising of the dignity and the safeguarding of the inherent rights of the individual has yet reached satisfactory heights or has been at all generally accepted by the two billion human inhabitants of this planet. Unmindful of the halting and laborious course of

* Being the Presidential Address at the Fourth Annual Convention of the Ontario Association of Pathologists.

the development of democracy over the past 1,000 years, those states which have developed and practised it appear to have forgotten that there are still hundreds of millions of human beings who have not, as yet, to any appreciable extent, adopted or even seriously attempted to practice democratic principles; who, indeed, despise them, envy the condition of those who practise them, and who aim at the overthrow and subjugation of those states which have brought the practice of them to its present admittedly imperfect state.

When democratic peoples become realistic and face the fact that, for centuries yet, the overwhelming probability is that the most serious threat to freedom as they know it, will come from without rather than from within, and that they must develop such co-operation and take such measures in their own defense as will perpetually discourage and prevent the attacks of totalitarian-minded states, then and only then, will the world have a chance to enjoy another period of relative peace, comparable to that enjoyed during the greater part of the nineteenth century (the Pax Britannica). Then, and only then, will the arts and sciences, including Medicine and our own science of pathology, again flower as they did in that memorable era which witnessed the epochal contributions of Bichat, Bright, Rokitansky, Virchow, Cohnheim and a galaxy of others, not to mention the final development of the science of bacteriology and of its handmaiden immunology.

Pathology, the study of morbid changes in the tissues and organs, is as old as the race. It stems from the observations of the ancient priests of Egypt, Babylon and Assyria, of Imhotep, of Celsus, of Hippocrates and of Galen. Moses, whose prohibition of the use of the flesh of swine as food argues some knowledge of the cause of disease, must have suspected the presence of trichiniasis. Wherever in the long reaches of time over the past 7,000 years one sees an individual more observant and logical than his fellows, who scanned the criteria of disease, associated with them co-incidental body changes, and formulated a theory as to the etiology, there one sees a pathologist. With the steady, and, since the Renaissance, the relatively rapid improvement in technical methods for the study of morbid changes in tissues and organs, with the great increase in the amount of post-mortem study, with the evolution of the microscope, and with the development of bacteriological, serological and biochemical technique came, in succession, Morgagni with his "Seats and Causes of Disease", Bichat with his "Treatise on Membranes", Rokitansky with his "Manual of Pathological Anatomy", and Virchow with his "Cellular Pathology". The nineteenth century saw the flowering of the old, yet new, science of pathology, the contributions coming mainly from Continental Europe, and particularly from that country which, for the past several decades, has been subordinating cultural and scientific pursuits to an attempt to establish political hegemony over Europe, and, indeed, over the whole world. The lights of science have been going out in Europe over the past generation; they have been burning ever more brightly on this Continent and in this country since the dawn of the present century. Canadian pathologists have played their part.

The present generation of pathologists in Ontario, and in Canada generally, is still close to the Canadian pioneers in this field. During the first decade of the present century, pathological and bacteriological work was almost entirely confined to schools of medicine. The laboratory in Hamilton was established in 1910 and was among the first to be organized in an institution without medical school connection. The ground work of pathology in Canada had been well and truly laid by the pioneers, and, among these, first place must, I think, be given to Professor J. G. Adami, of McGill, and to my own teacher, and the guide, philosopher and friend of my early years, Professor J. J. MacKenzie, of Toronto.

The influence of these two great teachers, guiding as they did the art and science of pathology in this Dominion through the difficult formative period, was incalculably great. The mantle has fallen upon our shoulders; to us has been thrown the torch; be ours to hold it high. Upon us rests the responsibility of holding to the standards set, of keeping the pathologist in that high position in relation to his medical confrères, and to the public itself, to which he is so eminently entitled and which in the past has been so grudgingly granted. His work is not, from the point of view of the public, spectacular when compared with that of other specialists, notably the surgeon and the radiologist. He has little contact with the patient, who, in the past has been prone to accord to the latter the glamour, kudos, and as well very substantial material rewards which have been the ac-

companiment of service of this type. But the clinician and the specialist have leaned heavily upon the pathologist and his opinion, and would, indeed, suffer the severest limitation in the efficiency of the service rendered, were it not for the pathologist, sitting in his laboratory with his microscope, or ascertaining, in that court of final appeal, the post-mortem room, the degree of accuracy of their diagnoses and the reasons for the failure of their therapeutic measures. In the diagnosis of cancer, he is the keystone of the arch; he finds here his most vital, exacting and responsible task; and again he is the court of last appeal. I have often wondered which would cause the greatest disturbance in the work of the hospital or of the clinician, or what is more important, the greatest hazard to the welfare of the patient—the sudden suspension of the service rendered by the pathologist and his laboratory, or, on the other hand, the sudden termination of that rendered by the radiologist and his. Undoubtedly there is something to be said on both sides of such a question; but, I think that you and I have little doubt in the matter, and that our opinion will receive increasing support from profession and public alike. In the last analysis it is the patient whom we all serve. We of this generation of pathologists are charged with the duty of establishing in the minds of clinician and patient alike our specialty as the keystone in the arch of diagnosis, and then, and not till then, will pathology assume its rightful place and the humble pathologist receive his due reward.

The pathologist, in common with all his fellows who practise the Hippocratic Art, has many problems to face; the solution of many of them calls for a lifetime of effort. Could he practise his art for a thousand years, he would still have to face new problems in diagnosis; man is not a machine run off the assembly line, nor does nature ever exactly repeat herself in the production of her creatures. He will have, so to speak, endogenous problems, arising within himself and calling for self-discipline and self-control; he will have, as well, exogenous problems arising out of his relationship to his environment.

He must ever maintain within himself that spirit of humility which is the mark of the true scientist. The intensely egotistical pathologist should never forget the scriptural adage that "pride goeth before a fall and a haughty spirit before destruction". In no sense, however, should he lack pride in his calling, submerge his self-respect, or allow himself to suffer from any inferiority complex. The meek do not, in a material sense at least, inherit the earth, and a moderate amount of this world's goods is essential. He must, while acknowledging to himself and to his fellows his human limitations, always strive to maintain that intellectual honesty which teaches him "how little he knows, but that he knows his little well". Though he can, with his microscope and with the other implements of his art, prosecute the search for truth to a point far beyond that attainable by the clinician, yet there is always before him a veil, behind that of the clinician, beyond which even he, as yet, cannot penetrate. Should he ever assume that he can find the solution of every problem with which he may be faced, he should remember the gentleman who had for his epitaph, "Not dead but sleeping", and of which a casual observer remarked, "He is not deceiving anyone but himself".

A good surgeon should be able to diagnose, in the gross, perhaps 80 per cent of the neoplasms he meets with in his practice. The good pathologist who sees the total of all the neoplasms removed by all the surgeons of his hospital should be able to diagnose, in the gross, perhaps 90 per cent. With his microscope he can settle the diagnosis of a further 6 to 8 per cent, but there will remain a small percentage of cases, concerning which the opinions of the best and most experienced pathologists will differ, and where the true diagnosis must wait until the disease or the patient has run his course. Or, again, any pathologist, with a large autopsy service knows that, in an occasional case, the cause of death even after the most exhaustive study may not be revealed. Should he ever reach the stage when he hesitates to admit these things, he needs to undertake a thorough heart searching and to take stock of his intellectual honesty. As Professor E. R. Long says, in the introduction to his "History of Pathology", "It may surprise him to know that some of the greatest masters in the subject have made some of the worst mistakes".

He must constantly look to the cultural and broadly educational side of his development. He must not narrow his general reading down to the newspaper, the novel and the popular magazine, useful and entertaining though they may be. The habit of keeping abreast of the scientific literature of his specialty is formed early and persists. The habit of broadening his contacts

with human nature by travel (coincident with post-graduate study); by attention to good literature, good music and art; by a constant interest in and familiarity with archæology, the mother of ancient history, and by the development of an all round knowledge of the facetted nature of the human individual, must also be formed early if it is to persist. This habit, once acquired, remains a constant source of mental refreshment. The history of medicine and of pathology is an entrancing subject; the history of the slow and painful upward struggle of the human being through the centuries is no less entrancing. As Pope has said, "The proper study of mankind is man". All culture is based on a knowledge and appreciation of the finest intellectual accomplishments of the human being, up to and since the Age of Pericles, at which time the Greeks set standards of culture never since surpassed.

He must, at times, face the problem of being swamped with routine work to the point where he tends to become an automaton, grinding out reports on a mass production basis. This has been too often the lot of the pathologist attempting to cope with a rapidly expanding volume of work, for which staff and equipment are being so tardily added as to never quite overtake the need at any particular time. The young pathologist needs ample material if he is to develop at a satisfactory rate, but when the amount passes the stage at which he can do his work in a careful, thoughtful and philosophical manner, both he and the work begin to suffer. Certain laboratory investigations do, perhaps, lend themselves to mass-production methods, being sufficiently simple in their interpretations as to present no difficulty to well trained clinicians; but pathology is not among them. Every surgical specimen which passes through the hands of the pathologist is an entity, and emanates from a human individual, rather than from a case. Every post-mortem examination is a final study of a completed human life; not merely another case of pneumonia, tuberculosis or cancer. The surgeon who demands a "snappy" diagnosis in five minutes, this afternoon, or not later than tomorrow, and the clinician who demands a cause of death before the toilet of the body is completed, because the insurance company or the undertaker is waiting or because he must tell the friends something, are revealing a very limited grasp of the true nature of their own vocation, or of the true function of the pathologist. It is true that in the great majority of cases the experienced pathologist can accommodate him; it is equally true that the pathologist who undertakes to do it in all cases is branding himself as incompetent, and is laying his intellectual honesty open to question. The hours or days spent on an out of the ordinary case, in careful consideration and in the correlation of all available data concerning it, are in themselves evidence that the pathologist is conscious of his responsibility, primarily to the patient, and secondarily to the patient's physician. The pathologist gives no service but that of an expert opinion, and to be of value, it must be given as the result of the exercise to the full of his powers of observation and of deduction, based on trained habits of thought and on his powers of logic. He should do his work in a thoughtful leisurely fashion if he is to be at his best. In his case there can be no such thing as a useless report; it is either of great value, or, if carelessly made and in error, it is misleading to the clinician and therefore harmful to the patient.

He must deal with the clinician who neglects, or forgets, or is unwilling, to furnish clinical data with specimens for examination. An inherent weakness in human nature makes some clinicians just too careless to do it themselves or to see that it is done. A generation ago, this problem was based on the impression in the minds of too many clinicians that the pathologist was some sort of crystal gazer, who should be able to produce a correct diagnosis with no clinical data whatever, and that any request for such information was a confession of weakness. Happily this attitude has almost passed away. Close co-operation between clinician and pathologist pays big dividends to the patient, who is entitled to the opinion issuing from their joint efforts and study. The reputation of either clinician or pathologist pales into insignificance beside the interests of the patient.

The rôle of the pathologist, in importance, takes second place to that of no other worker in the field of medicine. He is a physician in the fullest sense of the word. He is capable in the highest degree of impartial judgment and of the impersonal approach to medical problems. He has technical ability of a high order; his rôle, however, transcends that of the purely technical worker, and makes of him, the guide, philosopher and friend of clinician and patient alike. He is a valuable consultant; he is constantly a teacher; he has unexcelled opportunities for research,

given adequate facilities; and as a citizen of his community or state, his actual and potential service is, or can be, in the front rank.

He is the consultant par excellence. He has before him the clinical as well as the laboratory side; the gross as well as the microscopic picture; the psychological as well as the physiological and pathological aspect. He can bring to bear not only sharpened powers of observation, but logic and powers of deduction, based not only on trained mental processes, but also on his ability to visualize clearly the pathological changes underlying symptoms and history.

He is always a teacher. He must constantly teach himself. He must teach his assistants and associates; his relationship to his institution and to the clinician embraces that of the teacher. Not all of us find ourselves in the rôle of the professor; not all of us are especially adapted for that eminent vocation. But all of us, if we are to approach the upper rungs of the ladder, must cultivate the psychological outlook of the teacher. Teaching, above all, calls for clear consecutive thinking, the orderly marshalling of facts and data, and the ability to draw logical conclusions, qualities which are of prime importance to the worker in any scientific field. They are the attributes which fit the individual to practise the science and art of pathology.

The pathologist is inevitably a research worker. The lines may fall to him in an institute devoted to abstract research; he may be a member of the staff of a department of pathology with a definite part of his time devoted to research; or he may be a routine worker with a large amount of varied material passing through his hands. In any case, his training, his knowledge of both clinical and laboratory aspects, his broad grasp of and outlook on any problem of human disease, qualify him to make valuable contributions to the advancement of knowledge in his field, even though these contributions may never write his name into the annals of history, or give him the undying fame of a Pasteur or of a Banting. Research in pathology comes particularly within the field of the hospital pathologist; but, unfortunately too often, is he so pressed with routine work, or with inadequate facilities of technical staff and equipment, that during his potentially productive years little time or energy remains for the attention to the channels of research, which in the course of his study and experience are constantly opening up before his eyes. We of this generation have had this problem; our successors will, without doubt, be more fortunate.

The pathologist is no mean citizen of his community or state. The qualities of mind and heart so essential to the practice of his art make him especially valuable in this rôle. He has before him the example of Virchow. He learns much of the "seamy side" of human nature; and more of its fundamental virtues. He acquires in more than a literal sense much "inside information". He learns human nature from the ground up, he is conscious of its potentialities and of its limitations. He is amply qualified to enter fully into the corporate affairs of his community, not as a politician but as a citizen with a more than ordinary grasp of the problems, the needs, the fears and the hopes of humanity. Democracy needs such men as he if it is to survive.

There has been in this country over the past quarter century a rapid development of the field of pathology. Our Association numbers fifty members. We of this generation have borne the burden and heat of the day. We have laboured, often with woefully inadequate facilities; we have been, at times, well nigh swamped with routine work and we have found it difficult to keep alive the urge to do original work and to add something to the sum of human knowledge in our field. We have patiently borne "the slings and arrows of outrageous fortune"; we have kept our courage in the face of seeming lack of appreciation on the part of public and profession alike. We have seen the material rewards and the acclaim of the multitude go to the surgeon, the specialist and even to our fellow laboratory worker, the radiologist. "Fair science frowned not on our humble birth" even though we have been, in the main, "to fortune and to fame unknown". But let not "Melancholy mark us for its own". When this totalitarian threat to our country, to our Empire, to ourselves, to our children and to our children's children shall have been dissolved, when we, and our fellow Canadians shall have learned the bitter lessons of history; when we have learned to accept only such leadership as will formulate a national policy based on these lessons, laying primary stress on the duties and responsibilities of the citizen, in peace time particularly, then may our fair Dominion look forward to that period of development which is her birthright. Then will Pathology in Canada enter into its own, and then will Canadian pathologists occupy that

position which their predecessors have so willingly, laboriously and patiently fashioned for them since the dawn of the century in this land of freedom, which you and I and our fellows have, for the past twenty years at least, taken far too much for granted.

Robert Louis Stevenson paid eloquent tribute to the physician of his day in these words; and to no class of physician do they apply more fittingly, than to the pathologist,—

"He is the flower (such as it is) of our civilization; and when that stage of man is done with, and only remembered to be marvelled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of his race."

CIRSOID ANEURYSM AFFECTING THE AUDITORY AURICLE

BY A. A. KLASS, CAPTAIN, R.C.A.M.C.

Winnipeg

CIRSOID aneurysm is the name given to a diffuse tumour formed of tortuous dilated blood vessels. It occurs most frequently in the area of distribution of the superficial temporal and occipital vessels. Although the cause is not definitely established, most surgeons accept the condition to be congenital and to be due to abnormal communications between moderate sized arteries and veins. Henry Searby,[1] in a comprehensive review of the subject, states:

"There thus appears to be considerable evidence that cirsoid aneurysm, racemose aneurysm, aneurysm by anastomosis, and pulsating angioma should be regarded as due to the same cause as arterio-venous aneurysm, that is, an abnormal communication between the arterial and venous systems, and, further, that such abnormal communication may be developmental or traumatic in origin. Because this communication in cirsoid aneurysm is between veins and arteries which, although small, contain blood at a pressure which is high compared with that in the veins, the condition is progressive because the arterial blood in the thin-walled veins causes a progressive dilatation. In the case of the so-called simple angioma, and of nævi, the difference in pressure between the immediate pre-capillary arterioles and the immediate post-capillary venules is so slight that the vein wall withstands, for the most part, the pressure, and a balance is arrived at, so that the condition remains stationary."

The classical type of cirsoid aneurysm affecting the vessels of the scalp is comparatively well known, but the condition affecting primarily the vessels of the auricle is only casually mentioned in the literature, and no reference can be found to the special difficulties involved in treatment of the affection at this site.

It is well known that the vascular supply of the scalp is very liberal, and it is upon this basis that extensive procedures, if need be, complete excision, can be attempted when the tumour mass occurs in the scalp proper. This requirement does not hold when the tumour is present on the auricle. The skin of the auricle is normally thin, its blood supply limited, and it lies on a mound of cartilage that can be excised only with serious cosmetic effect.

The following is a description of a cirsoid aneurysm primarily affecting the auricle where treatment became imperative due to hæmorrhage.

CASE REPORT

An otherwise healthy sailor reported in July, 1940, that his left auricle bled upon slight friction. For as long as he could recall, his left ear was more prominent than the right and for the previous six months he had occasionally noted blood on his towel when he dried the ear after washing.

At the age of three he had diphtheria, requiring tracheotomy. When twenty years of age he had "meningitis" for which he received hospital treatment for six weeks. Following this illness he underwent an operation on his left eye, to correct a strabismus. There was no history of injury to the head and the condition of the ear preceded the date of operation on his left eye.

General examination revealed a healthy male, bearing a tracheotomy scar in the lower mid line of the neck, and a transverse scar along the upper orbital margin.

The left auricle was obviously larger than the right and jutted out from the head at a right angle. There was visible arterial pulsation of the auricle *en masse* and it was dusky in colour in contrast with the normal pink colour of the right auricle.

On the upper two-thirds of the medial surface there was a mass of dilated and tortuous blood vessels covered by attenuated skin, in the centre of which was a small superficial ulcer. This bled readily with friction but stopped bleeding on the application of firm pressure.

In the temporal region above and behind the ear, for a distance of about two inches, the scalp was uneven and rippled by tortuous vessels, but these did not form a definite tumour mass. The left side of the neck immediately below the auricle was more prominent than the right, and a large dilated vein, corresponding in position to the common facial vein, could be palpated in its course across this area. The superficial temporal vessels were decidedly dilated and sinuous. Obliteration of these vessels did not to any degree affect the vascularity of the auricle.

TREATMENT

At the outset, it was apparent that the orthodox treatment of excision of the vascular mass in stages (as described by Clunis[2] and Garcia[3]), would at this site be impossible without sacrificing the upper two-thirds of the auricle, resulting in serious disfigurement.

Because at this time (July, 1940) the bleeding did not seem excessive and medical help was readily available, it was decided to temporize, in the hope that the avoidance of friction to the ear might permit the ulcerated area to heal. This was in fact achieved, and there was no further hæmorrhage for the next nine months. Following this period however, the bleeding recurred, and despite all conservative measures, became progressively more difficult to arrest. Some form of active treatment became imperative.

One of the methods taken into consideration was the injection of a sclerosing solution into the mass. Although unknown to me at the time, the use of a sclerosing solution was suggested for cirsoid aneurysm by F. W. Marshall,[4] 1937, as a preliminary to excision.

From general experience with the injection of varicose veins it may be predicted that wherever the flow of blood is swift, the sclerosing solution has no effect, being rapidly carried away before it can exert its action on the intimal lining of the vessels. It is this experience that has led to the ligation of veins as a preliminary to the injection treatment of varicosities.

In this instance it was considered that suitable conditions for injection of a sclerosing solution could not be achieved without prior ligation of the main afferent vessels. Since obliteration of the superficial temporal vessels did not reduce the vascularity of the mass, it was decided to ligate the external carotid artery as a first stage in the treatment.

In August, 1941, under ether anæsthesia the external carotid artery was doubly ligated and cut. Some difficulty was encountered in exposing the artery, due to a widely dilated common facial vein which filled the carotid triangle. In addition to the external carotid artery, the superficial temporal vessels were ligated.

Immediately following the ligation, the vascular mass became reduced to about one-half its size, and no longer pulsated visibly.

Two weeks after the operation 0.5 c.c. of 5 per cent sodium morrhuate was injected into the middle of the mass. An attempt was made to inject this into a vessel but this did not succeed and, accordingly, the injection was made interstitially. Within twenty-four hours there was considerable reaction, manifested by swelling of the mass to much more than its original size, and by a black discoloration of the skin. This gradually subsided however and when last seen the mass had completely disappeared. The skin was unbroken, with a normal pink colour, and the auricle had an even contour and was no larger than its fellow.

SUMMARY

A case of cirsoid aneurysm primarily affecting the auricle is described.

A method of treatment without sacrifice of appearance is outlined.

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Case Report

SPONTANEOUS HÆMOPNEUMOTHORAX

BY R. G. LEA, CAPTAIN, R.C.A.M.C.

Halifax

Although spontaneous pneumothorax occurs with relative frequency the additional occurrence of massive hæmorrhage into the pleural cavity is comparatively rare.

Because of the rarity of the condition the following case is reported.

W.J.C., aged 26, serving as an army clerk was admitted to Halifax Military Hospital July 26, 1941. Twelve hours previously, while riding as a passenger in a motor car, he suddenly developed a dull aching pain through the left chest. Almost immediately this radiated to the left shoulder and became severe. He felt weak, breathless, and was forced to lie down. About an hour later he felt better and was able to resume his work, but was later forced to go to his quarters because of the pain in the chest, breathlessness, and weakness. His condition remained unchanged up to the time of admission.

For about three weeks prior to this he had had a cold, but this had not been severe enough to incapacitate him. Otherwise he enjoyed excellent health. There was no cough or sputum, no hæmoptysis, no loss of weight, strength or appetite, no history of pleurisy and no known contact with tuberculosis.

On examination he looked acutely ill, but was lying comfortably flat on his back. He was pale. His respirations were 28, pulse 110, temperature 99.6°. There was restriction of movement of the entire left chest. Fremitus was decreased, and the percussion note was dull from the angle of the scapula to the base, but elsewhere appeared normally resonant. Breath sounds were distant from apex to base, with a definite blowing quality at the base. The white blood cell count was 16,800, and the hæmoglobin content 54 per cent (Sahli). The following day his condition remained essentially unchanged, except that there was now evidence of a larger effusion than before. The

trachea and mediastinum were shifted far to the right. A portable x-ray plate of the chest showed the effusion reaching up to the 2nd rib anteriorly, with a large pneumothorax above this. Only a very small amount of lung tissue was visible above the fluid.

At this time and during the next two days his general condition was satisfactory. There was little respiratory distress. His respiration ranged around 24 per minute, his pulse 80 to 90 per minute, his blood pressure was around 126/76/72. Hæmoglobin had fallen to 42 per cent on the second day and remained at that level.

On July 31st an aspiration of his chest was performed and thick dark blood was obtained: 500 c.c. were removed before an attack of coughing made it seem wise to stop. There was no change in his condition, nor in the x-ray appearance of his chest. Hæmoglobin, pulse and blood pressure did not vary.

The following day he was given a blood transfusion of 400 c.c. and the chest again aspirated and 1,200 c.c. blood removed, and by altering his position, 300 c.c. of air removed. He was left with a slightly positive pressure. Again he withstood the aspiration in splendid shape, showing no change in his condition. The x-ray plate following this aspiration showed the fluid level down to the 4th rib. The lung had re-expanded, and was now about 30 per cent collapsed.

On August 2nd his hæmoglobin had risen again to 48 per cent and he felt appreciably stronger. On that day 1,200 c.c. of fluid were removed, and with it about 400 c.c. of air. He was left with a slightly negative pressure. The trachea and mediastinum had now returned to their normal positions. Breath sounds, though slightly depressed, were vesicular throughout the chest. An x-ray plate taken immediately after the aspiration showed the collapse to be reduced to about 10 per cent, this chiefly at the apex and base. Three days later he again showed evidence of a small effusion and 500 c.c. of blood tinged serum were removed. His hæmoglobin now had risen to 58 per cent and there was a steady improvement in his general health.

On August 24th, the x-ray plate of his chest showed a hazy appearance over the whole lower half. This was thought to be due to blood clot adherent to the pleura. No fluid could be obtained upon needling. The lung had completely re-expanded.

On September 10th the x-ray was repeated. The hazy appearance had entirely disappeared. The parenchyma was clear throughout, the diaphragm was smooth and rounded, and the costophrenic angle was clear. The heart and mediastinum were in their normal positions. There had been no cough or sputum. The hæmoglobin had risen to 70 per cent. The patient had gained weight and felt thoroughly fit. In this case no disease could be demonstrated in the lung parenchyma following re-expansion. There was no evidence of pulmonary tuberculosis, as has been reported in a small percentage of cases by other writers on the subject.

Hopkins[1] reported 3 cases and reviewed the literature in 46 more cases. Of these 49 cases, 6 proved immediately fatal, 6 subsequently were proved to have pulmonary tuberculosis, and 3 occurred while receiving artificial pneumothorax treatment for pulmonary tuberculosis. In two of the six fatal cases, tuberculous cavities had ruptured into the pleural cavity.

Kjaergaard[2] reported that in 49 cases followed up for periods of from 3 to 18 years, in only one case was pulmonary tuberculosis found. Beatty[3] reported one case which did not show evidence of tuberculosis at the time, but subsequently did.

Hopkins states that spontaneous hæmopneumothorax represents merely a spontaneous pneumothorax in which unusual conditions are present to give rise to a greater or lesser amount of bleeding into the pleural cavity. Two sources of hæmorrhage are suggested. A vessel in the wall of a ruptured vesicle may be torn, or the collapsing lung may tear pleural adhesions containing blood vessels.

With regard to treatment all writers on the subject agree that the blood and air must be removed to give relief from distressing dyspnœa. Beyond that point there is a divergence of opinion. Hopkins in his three cases did not remove more blood than was necessary to obtain relief. In all three cases excellent end results were obtained. Milharat[4] reported one case in which no blood was removed, except a small amount for examination. Absorption took four months. At the end of six and one-half years, the thorax on the affected side was shown to be markedly retracted, but apparently excursions were normal. Maxwell[5] removed all the blood in his case in three and one-half weeks, and is of the opinion the blood must be completely removed, though the time of removal and the amount to be removed on each occasion must be determined to suit the individual case.

In our case aspiration was not attempted until the fifth day, and was completed by the seventh day. It was felt, in view of his apparently static condition, that the bleeding had long since ceased, and sufficient time had elapsed to allow a firm clot to seal off the bleeding point, and that the danger of restarting further bleeding was minimal. Greater danger, it was felt, lay in allowing fibrin masses to form, interfering with the re-expansion of the lung. Jones and Gilbert[6] reported a fatal case in which fibrin masses were found at autopsy. They attributed the cause of death to these fibrin masses. Had our patient's general condition not been so favourable more time would have been taken in removing the blood. As he was quite able to stand complete aspiration, it was felt nothing would be gained by delay.

SUMMARY

A case of spontaneous hæmopneumothorax is reported. Treatment by complete aspiration in three stages over three days, resulted in full re-expansion of the lung and recovery of the patient.

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Editorials

HEALTH INSURANCE LEGISLATION

WE publish in the correspondence columns of this issue two letters on the subject of Health Insurance. It will be seen that legislation on Health Insurance is in process of being brought forward and that our profession is to be consulted through the Canadian Medical Association.

Do we, the profession, however, know what we shall say to the Government when we are asked for our opinion? The Association will be able to present the views of its members, views resulting from long and careful consideration of an intricate and difficult subject. But will the Government be assured that these views are those of the profession generally? Obviously it will not be so assured, and no matter how sound the opinions may be they still will be representative of only a section of the profession. The Government therefore will not be expected to attach to them as much weight as if they were from the entire profession. Where legislation is concerned the value of opinion is apt to vary directly with the number of those represented.

Here then is an urgently important reason for making our opinion not only weighty but decisive. There can be no clearer proof that the part medical men will play in helping to mould this legislation will depend on the extent to which they combine their efforts. The situation can be dealt with only by Dominion-wide unanimous support of the Association.

H.E.M.

THE SHORTAGE OF HOSPITAL BEDS

FROM all parts of Canada come reports that everywhere there is a serious shortage of hospital beds. Never, except during the influenza epidemic years ago, has there been such a widespread shortage as now exists. Doctors are having considerable difficulty in obtaining beds even for acute cases. What would happen if civilian patients had to be suddenly evacuated in case of an attack is not a happy thought.

Several factors are responsible: (*a*) the tremendous expansion of war industry has brought large numbers to every city and large town; (*b*) this has meant doubling up in houses with less space for a sick person; (*c*) the shortage of domestic help and the larger use of women in industry has left no one at home to care for the sick; (*d*) war industry means more accidents and, in some types, more sickness; (*e*) hospitals have built few additions in recent years, partly because of the higher cost of construction and the lack of materials, but more because of the present inability of the previously affluent citizens to make substantial donations; (*f*) the growth of hospitalization plans and the increasing number whose hospitalization is paid for by various agencies has tended to increase hospital use; (*g*) the increasing complexity of medical diagnosis and care and the obvious advantage of having available the extensive facilities and trained personnel of a hospital make hospitalization for all but minor illnesses very desirable.

The question is: What can be done about it? There is little likelihood of the demand decreasing until after the end of the war and the probability is that the shortage will become even more acute. It is not likely that there will be much general construction for some time unless such be undertaken and financed by the government. Present day financing for our voluntary non-profit hospitals is so difficult that the trustees rightly hesitate to take on further obligations unless both capital and maintenance costs

be reasonably assured. Moreover it is now almost impossible to obtain the extensive equipment, plumbing, hardware, etc., needed for hospital construction. Even metal beds, springs, mattresses and bedding are now very difficult to obtain and only after many months of waiting can they be procured.

Private hospitals or small nursing homes are now exceptionally busy carrying the overflow and it is but to be expected that more houses will be converted for such purposes. One regrets to see such a trend, for the medical supervision in these private hospitals is very haphazard, staff organization being almost entirely absent, and government inspection seldom extending to the quality of the medical work undertaken. The equipment, too, is usually scanty and the nurses frequently other than registered nurses.

As a partial solution, the following steps are suggested:

1. Arrange for the construction of cheaply built, but insulated, more or less temporary wings much as one adds temporary class-rooms to a school building. As these are for the welfare of the citizens, the hospital board, if it cannot finance the construction, would have sound arguments for asking the municipality to do so. Priority consideration in obtaining the minimum equipment for such buildings will probably be forthcoming. The arrangement is not ideal, but as we are all in this war, everybody must put up with makeshift services.

2. Convert all larger private rooms into semi-private. If a two-bed room can take a third, so arrange it. Wealthier people who want expensive rooms will just have to put up with less space for the duration. There still remains the problem, already mentioned, of getting the extra beds, but the sooner one orders, the sooner will the period of waiting for delivery be over. Most hospitals are already using sun-rooms, unnecessary sitting rooms, etc., for bed space, provided they have been able to get the furniture. If metal for gatch springs and metal bedsteads becomes too scarce, manufacturers might produce wooden beds so designed that gatch springs could be fitted into them later. Hospitals cannot afford to buy equipment that the public will refuse to use as soon as the war is over.

3. The medical staff can assist materially by discouraging hospitalization except where really necessary and by encouraging their patients to release their beds as soon as possible. In view of the shortage of skilled personnel, non-essential clinical and laboratory procedures should be minimized.

4. Evacuation to convalescent hospitals where possible. Unfortunately the utter lack of adequate convalescent facilities in all but a few centres limits the value of this otherwise logical suggestion. More should be established. Such step would be encouraged if more of the provincial governments were to arrange for grants and payments by the province and the municipality for the convalescent care of indigents, Quebec, Ontario and Manitoba now provide for such payments which, with private patient charges and gifts, permit convalescent hospitals to carry on.

G. H. AGNEW.

Editorial Comments

The "Samples" Racket

Comment has been made in the *J. Am. M. Ass.* (October 18, 1941), on a practice from which we in Canada so far fortunately are free. This is the organized business of collecting quantities of samples from the pharmaceutical manufacturers, dependent upon the well established custom by which pharmaceutical manufacturers send free samples of drugs to practising physicians. Of course the only intention behind this could be that of bringing the preparation to the attention of the profession, and the only use to which these samples should be put is their being freely dispensed. In this wicked world however there are those who watch their opportunity for taking advantage of what is after all a business courtesy. These people, there cannot be many of them but they definitely exist, make a business of collecting quantities of these free samples and then sell them. They send in requests to the manufacturers, over forgeries of physicians' names. The suggested remedy is that firms should comply with requests for samples only when these are made on the physicians' stationery.

H.E.M.

Notice to Advertisers

As already pointed out in these columns war conditions have brought about definite changes in the quality of our paper, and thus in the appearance of the printing. This has been due largely to the sharp reduction in the use of chlorine as a bleaching agent. We wish to draw attention to this again particularly in regard to the advertising pages. Advertisers are requested to eliminate copy requiring reverse plates, since this produces undesirable printing effects.

H.E.M.

Corrigendum

We wish to make the following addition to Captain H. Rocke Robertson's paper on "Crush Syndrome" which appeared in our February issue, p. 116.

In the pathological report on the kidneys the paragraph should read:

"Sections from both kidneys are identical. The general architecture is well preserved, except that there are small foci of interstitial lymphocytic infiltration in both cortical and medullary portions, and an occasional very small patch of fibrosis."

Also in the summary of the urinary findings the heading "Benzidrine" should be "Benzidene".

Medical Economics

COMMUNITY DOCTOR SERVICE

By W. S. Caldwell, M.D.

Supervisor of Health Services,

Toronto

The Canadian Red Cross Society, Ontario Division, in consultation with the Ontario Medical Association and the Department of Health, have inaugurated a Community Doctor Service which includes a plan of prepayment for medical care. Dr. Wilfred T. Cumming, a graduate of Edinburgh University and until recently with the Scottish Mission in Manchuria, is the first "Community Doctor". He has recently taken up practice in Desbarats, thirty miles east of Sault Ste. Marie, to serve the people of four rural municipalities in Algoma District.

The Red Cross Community Doctor Service has been introduced as an emergency measure during the present wartime scarcity of doctors, to assist rural and isolated communities to obtain the services of general practitioners. Over 25 per cent of the doctors in Ontario have enlisted in the Forces or volunteered for other war services. Although this depletion of doctors is affecting all parts of the province, the consequences have worked real hardship in some rural areas where no substitute could be found.

The financial arrangements are such as to assure the doctor a reasonable standard of living. A minimum income of four thousand dollars is guaranteed by the Ontario Division of the Red Cross. To apply against this are dues from subscribers, fees from private practice to residents who are non-subscribers and municipal grants. Additional income may be derived from services to workmen under the Compensation Act, from attendance upon tourists and other non-residents and from other sources.

The basis of service is general practice. The Community Doctor is the sole judge of what this includes, but no extra fees can be charged for any "added" service to a subscriber. The doctor provides his own transportation to home and hospital which must be within twenty-five miles. Patients provide their own drugs and supplies, except for emergency and office care. Provision is made for locum tenens for a two week holiday at the expense of the administration and for leave of absence for post-graduate study at the expense of the Community Doctor. As far as possible, the usual patient-doctor relationship is maintained and the administration does not interest itself in the diagnosis or treatment.

This last-mentioned provision is possible because of the voluntary aspect of the plan. Before the introduction of a new service and once each year thereafter, a family-to-family canvass is made for subscribers by the local Red Cross. Although dues are paid on a per capita basis, families which choose to become subscribers must participate as a unit, special provision being made for those with many dependent children. Families who do not subscribe in advance have to pay an additional 10 per cent and wait 30 days (maternity, 9 months) for service. Non-subscribers are related to the plan only with respect to the guaranteed income.

In these days of enlightened attitude towards public health, the plan will be of interest because of the emphasis on preventive medicine. The Community Doctor will be the medical officer of health, the stipend from the municipality being appreciably higher than usual, to help finance the entire project. The prepayment feature will encourage early consultation. The doctor's duties are understood to include prenatal and infant welfare care, immunization, school health as well as the usual attention to municipal sanitation. In the case of the present service in Algoma, the proximity of a Red Cross Outpost Hospital makes it possible for the doctor to have the assistance of a public health nurse, a circumstance which increases tremendously the potentialities for improved community health.

When, to the emphasis on preventive medicine is added the voluntary aspects of the prepayment feature, and the provision for centralized supervision, considerable promise of success is given to the entire experiment. Unlike the municipal doctor plan, a patient is free to choose his own "family physician" and no one need support the project if, because of location or otherwise, he prefers an "outside" physician. Municipal politics and disgruntled taxpayers are eliminated. The doctor is protected against unreasonable complaints and the patients are assured of the services of a well-chosen physician. The project has adequate financial protec-

tion and with direction by Provincial health officials and representatives of the medical profession, a sound, careful administration is assured.

Every student of rural health is aware of the need of improved medical services in the outlying sections of the province. It is the hope of the sponsors of this emergency experiment that some contribution will be made to this problem by the Red Cross Community Doctor Service.

Retrospect

THE SIGNIFICANCE OF RHEUMATIC NODULES IN CHILDHOOD*

BY R. R. STRUTHERS, M.D. AND H. L. BACAL, M.D.

Montreal

It is appreciated that rheumatic infection is a life-long disease in which there are various incidents or evidences of activity, which come to a point at which they can be clinically appreciated. There are apparently certain manifestations which have to do with the prognosis of the disease and on which some reliance may be placed clinically.[1] In our previous communications we have discussed some of these criteria which have to do with the determination of activity of the infection, insofar as they are at present possible of determination. There are certain other clinical manifestations which have to do with the possible prognosis, as regards the long distant future of the patient. For instance, it is known that the individual of five years of age, who develops signs of mitral insufficiency with his first attack of rheumatism, has a much more grave prognosis than the individual of fifteen, with the same clinical manifestation. It was thought that the presence of rheumatic nodules might be of some value in determining the future course of children with rheumatic disease.

The most complete review of the incidence and significance of nodules in rheumatism is that of Keil,[2] from whom I am taking the liberty of quoting, with due acknowledgment, rather freely, since his views tend to express the commonly accepted opinions regarding nodules, and his review of the literature is very extensive. The first accorded description of the occurrence of rheumatic nodules is credited by Keil to Wells of London.

> "In a masterly communication read on April 3, 1810, under the title 'On Rheumatism of the Heart', Wells recorded, for the first time, the occurrence of nodules in patients undoubtedly suffering from rheumatic fever. In his second case he observed that 'many of the tendons of the superficial muscles in this patient were studded with numerous small hard tumours, an appearance I have observed only in one other person, a thin and feeble man forty-one years old, who also laboured under rheumatism'."

Keil continues:

> "In children, rheumatic nodules appear as subcutaneous infiltrations varying in size from that of a split-pea to that of a walnut, and, exceptionally, even larger. They are usually spherical or oval in shape and, as a rule, well circumscribed. Generally, there is more or less projection above the level of the surrounding skin, though in many instances careful palpation may be required to demonstrate the presence of a small localized lesion. The overlying integument is unchanged in appearance and freely movable over the individual nodules.
>
> "The infiltrations are firm and somewhat elastic in consistency. Sometimes the sensation imparted to the touch is similar to that of a fibroma or of cartilaginous tissue or, less commonly, of bone. In their evolution they may become soft and feel like fatty tumours. They do not usually cast shadows on roentgenographic plates.
>
> "Statistical studies indicate that the average number of lesions observed is about three or four. At times only a single nodule, or perhaps two, may be discovered, but in such instances the utmost circumspection is necessary to avoid errors in diagnosis. Occasionally there may be as many as 30 or 40 and, rarely, the number may reach 150 or even 200 or more. In some cases, the nodules are, from inception, disposed in a remarkable symmetrical arrangement; at times this effect may only be produced after successive crops have appeared. Symmetry of distribution is, however, not an essential attribute.
>
> "As a rule, the appearance of subcutaneous nodules, however profuse they may be, is not attended by subjective symptoms, either spontaneous or on palpation. Swift attributed the painless character to lack of proximity to nerves.
>
> "One of the principal characteristics of the rheumatic nodule is its occurrence in crops which may be single or numerous. There may be an abundant outbreak composed of lesions of variable dimensions. There is a definite tendency to spontaneous involution; in many cases the nodules are truly ephemeral, appearing overnight and disappearing rapidly. The manifestation may present itself clinically within a period of from 24 to 48 hours, and completely disappear in three days. On the other hand, Findlay observed lesions apparently remaining over one year, and Swift saw examples of the phenomenon requiring months to years to attain complete development.
>
> "It is now recognized that this manifestation occurs far more often in children than in adults. Of the 27 examples of subcutaneous nodules recorded by Barlow and Warner, 20 appeared in subjects below the age of 14 years. Thus, the lesions are but rarely seen in infancy and in children below the age of three years. . . . It appears that the highest incidence occurs between the ages of 8 and 14, with progressive decrease thereafter."

Concerning the association of nodules and heart involvement, Keil states:

> "The association of progressive cardiac disease and rheumatic nodules has been noted as far back as 1881. Garrod remarked that 'although cases occur in which crops of nodules are developed while the heart shows no evidence of disease, such cases are quite exceptional'. Findlay had not observed a single example

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of this lesion where the heart was not affected. Voelcker had seen but one instance in which there was no evidence of endocarditis or pericarditis, despite an experience covering hundreds of examples of rheumatic subcutaneous nodules. On the other hand, Still stated that he had observed the manifestation accompanied by arthritis and chorea, without implication of the heart; in two children the appearance of nodules was subsequently followed by disappearance of the cardiac murmurs, the heart remaining normal clinically for at least three years. Nevertheless, Still remarked: 'In some of the few cases in which I have seen rheumatic nodules without evidence of cardiac affection, definite signs of endocarditis have appeared within a few days or weeks after the appearance of the nodules.' Merritt encountered but a single instance without associated cardiac lesion, but accompanied by acute articular rheumatism. Smith and Sutton described a case in which chorea was succeeded by subcutaneous nodules in the apparent absence of clinical signs of heart involvement. In discussing the manifestations, Poynton stated that cases occur in which they precede any cardiac disease, as in the case of a child in whom they developed months before any cardiac lesion and then disappeared, again developing with the advent of a slight chorea. Finally, a mitral lesion of the sclerosing type supervened.

"Clinical observation has, therefore, revealed the almost invariable association of evidence of organic valvulitis in cases exhibiting genuine rheumatic subcutaneous nodules."

The most recent statement on the incidence of nodules is found in "The Problem of Rheumatism and Arthritis",[3] in which it is stated that "The incidence of subcutaneous nodules in rheumatic children was 1.0 and 4.0 per cent respectively in two American reports. Fernando found no nodules among 214 rheumatic patients in Ceylon (only 9 of his patients were under 10 years of age)."

May Wilson in her recent volume on "Rheumatic Fever",[4] states that:

"Rheumatic nodules usually appear in the subacute stages of rheumatic infection. The relative incidence of rheumatic nodules is difficult to estimate since they are often overlooked, particularly in fleshy children. Their incidence probably closely parallels that of active carditis, and they are as frequently unrecognized. Of 367 rheumatic subjects in whom cardiac involvement was insidious and subclinical, nodules were observed in 3 per cent. In comparable series of 119 rheumatic subjects observed during the course of active carditis nodules occurred in 20 per cent of the cases. Of 97 children who died, nodules were present during the course of the disease in 33 per cent. . . . The occurrence of rheumatic nodules in a patient during the subsidence of an active carditis probably indicates regression of the exudative phase, and in that sense is of favourable prognostic significance."

In support of this view of the serious import of rheumatic nodules may be quoted the following from Klein:[5]

"Although it is generally conceded that rheumatic nodules indicate proliferative changes, there are divergent views concerning the significance and prognostic import of these nodules. A number of investigators have expressed the belief that the presence of rheumatic nodules indicates a severe infection with a relatively poor prognosis. In discussing the paper of Struthers and Bacal, Schlutz stated that the onset of rheumatic nodules presaged an unfavourable change in the condition, while Hart stated: 'My associates and I had come to look on nodules as an evidence of rheumatic carditis whether this was suggested clinically or not. In my own experience, the patients who had nodules did not usually show subsidence clinically, as far as the carditis was concerned, for some time afterward.' Brim found rheumatic nodules in the oral and pharyngeal mucosa of many rheumatic patients and was of the opinion that their presence was related to the rheumatic activity. Shapiro stated 'In our clinic I have seen rheumatic nodules most commonly in those patients who had serious rheumatic disease and in whom the prognosis was not good.' King commented: 'Rheumatic nodules represent proliferative changes and most often occur in patients with severe heart disease. Their presence indicates active disease and their disappearance is associated with improvement. Their presence should be considered as evidence of activity for the period of their existence, which may be from a few days to several months'."

As against this view McCulloch[6] may be quoted as follows:

". . . nodules in the rheumatic child mean that the patient is getting better. The disease may be getting worse, but the tissues are showing more response, and the ability to respond is a favourable sign."

From the above it may be gathered that there is no unanimity of opinion regarding the association of nodules with active or progressive rheumatic disease, or other significance. Our own view, as previously expressed, was to the effect that rheumatic nodules appeared only when the patient was showing evidence of clinical improvement and a falling sedimentation rate, and that their significance was not necessarily of serious progressive disease.

Concerning the pathology of the nodule, Wilson[4] goes on to say:

"Fifty years after Wells' original description of rheumatic nodules in 1812, many observers began to report the occurrence of subcutaneous nodules in children with rheumatic disease. On pathological examination fresh nodules have a greyish, translucent, gelatinous appearance; on cut section, they show in the more central portions minute yellowish opacities. The opaque areas are described as irregular strands of homogeneous necrotic tissue (collagen) in which there is some fibrin. Klinge considers the characteristic lesion to be 'fibrinoid' swelling in which bundles of collagen are embedded. Surrounding these areas there is a mantle of large monuclear and multinucleated branching polygonal cells which are similar to Aschoff cells in the myocardial nodules. The rest of the nodule is composed of a highly vascularized and often œdematous mass of tissue which is made up of fibroblasts, epithelioid cells, a variable number of round cells, polymorphonuclear cells and eosinophils. Almost all the blood vessels show endothelial proliferation, frequently to the extent of obliteration of the lumen. The rapid disappearance of nodules at times is probably the result of absorption of necrotic material, œdema and fibrin."

It had previously been taught that the Aschoff body was diagnostic of rheumatic disease, and that the Aschoff body and the rheumatic nodule were pathologically almost identical. The latter statement is possibly not now correct, and some doubt has been cast on the pathological significance of the Aschoff body. However, from most pathological descriptions it would appear that there is a very distinct similarity between the Aschoff body and the rheumatic nodule, and clinically it has been

accepted for many years that the rheumatic nodule in childhood is probably of diagnostic importance. In a recent publication entitled "The Problem of Rheumatism and Arthritis",[3] the authors state that:

"There has been so much debate as to what should be called an 'Aschoff body' that a paper by Aschoff himself defining these lesions is especially valuable; under this term Aschoff includes not only the myocardial nodules but also similar lesions in other organs, *e.g.*, the subcutaneous nodule. He re-iterated his belief, also shared by Collins, that the initial tissue change involves the cells; he argued against Klinge's view that fibrinoid degeneration of ground substance is the earliest stage and that cellular changes are secondary. According to Aschoff, myocardial nodules are specific for rheumatic fever."

In discussing the pathology of rheumatic fever, Klein states:[5]

"Swift has pointed out that the pathological processes in rheumatic fever resemble to a certain extent those occurring in tuberculosis. In the evolution of the rheumatic lesion three stages are recognized. Swift, and more lately Skworzoff, have shown that the first stage is exudative, being characterized by effusion into the joints and serous cavities and by œdema and cellular infiltration of the myocardium and endocardium. In the heart focal areas of necrosis may occur. Following this is the state of healing, in which the outstanding event is proliferation in and about the injured tissue; this may lead to the so-called specific granulomas of rheumatic fever, the Aschoff bodies. Finally the granulomas and injured tissues are replaced by scars. . . . Mote, Massell and Jones have shown that there are several stages in the evolution of the so-called specific rheumatic nodule. These are (*a*) structural alteration in collagen, with œdema and fibrinous deposit; (*b*) vascular damage and polymorphonuclear and lymphocytic infiltration, with proliferation and early peri-vascular mesenchymal cells invading the altered collagen foci, and (*c*) later gradual and progressive organization from peri-vascular areas to centres of necrotic foci. This last reaction involves among other cells, multinuclear cells which stain somewhat like fibroblasts, and can deposit intercellular collagen. This ultimately leads to progressive organization and replacement of the lesion with fibrous tissue. It appears that the pathological processes leading to the formation of the rheumatic nodule are the same whether the nodule occurs in the subcutaneous tissue or in the heart."

Since rheumatic fever is a disease characterized by, firstly, an exudative state, then a proliferative, and finally a stage of scarring, a test which would be of assistance in determining when the factor of exudation is no longer predominant, is of value; such a test is the Weltmann reaction. As stated by Henry,[7] "The basis of the Weltmann test is the empirical observation that the concentration of calcium chloride required to complete heat precipitation of the serum proteins varies with the clinical condition of the subject", apparently depending partly on the fibrinogen content of the serum.

In comparing the value of the Weltmann reaction and the sedimentation rate, Klein[5] goes on to say:

"According to the length of the coagulation band in the Weltmann reaction, rheumatic fever can be divided into three phases: (*a*) the exudative stage, characterized by a low coagulation band; (*b*) the stage of repair or proliferation, associated with a normal or increased coagulation band; and (*c*) the stage of equilibrium, associated with a normal coagulation band, in which there may be complete cessation of pathologic activity or in which proliferation and exudation may counterbalance each other. The sedimentation rate is usually increased during the proliferative stage of rheumatic fever to the same degree that it is during the exudative stage. Usually it is not until proliferation has ceased and the entire rheumatic process has come to a standstill that the sedimentation rate becomes normal. . . . An increased sedimentation rate does not always mean that the rheumatic infection is still active. The patient may be convalescing, in a phase which is pathologically termed the proliferative stage, and still have a rapid sedimentation rate."

This statement of Klein's is contrary to our previous experience with the use of the sedimentation rate as an index of activity of rheumatic fever. Since 1933, we have published a series of communications concerning the significance of the blood count and the sedimentation rate in rheumatic disease in childhood, on which we based certain conclusions, which may be briefly stated.[8]

1. Congenital heart disease shows no noteworthy alteration of the white blood cell count, the sedimentation rate, the sleeping pulse and the body weight.

2. Acute rheumatic fever, uncomplicated, shows a high sedimentation rate, usually a leucocytosis of 12,000 to 15,000, fever, approximation of the sleeping and waking pulses during the period of fever, and loss of weight. All these evidences of activity tend to subside *pari passu* with the clinical evidence of subsidence of the infection.

3. Chorea without carditis shows no alteration in the total white blood cell count, sedimentation rate or fever; there is usually a marked difference between the sleeping and waking pulses, the former being normal. Under treatment there is usually a gain in weight.

4. Rheumatic fever with carditis shows marked alteration of the sleeping pulse, white blood cell count and body weight, which tend to return to normal with the subsidence of the infection. The sedimentation rate, however, requires a period of months to return to normal, and hence is probably the most delicate of these tests in the determination of activity of rheumatic infection, excepting in the presence of cardiac failure with œdema, when it falls rapidly to levels below the normal and is of grave prognostic import.

5. Chorea complicated by carditis, even in the absence of fever, shows the same changes in these criteria as does rheumatic fever with carditis, excepting the absence of leucocytosis.

We have previously presented a series of charts from chorea, rheumatic fever and carditis patients, in relation to the sedimentation rate, and concluded that, in our opinion, rheumatic nodules only appeared when the sedimentation rate was falling, and not when the sedimentation rate was high, and accepted the sedimentation rate as the most accurate index of activity of rheumatic infection.

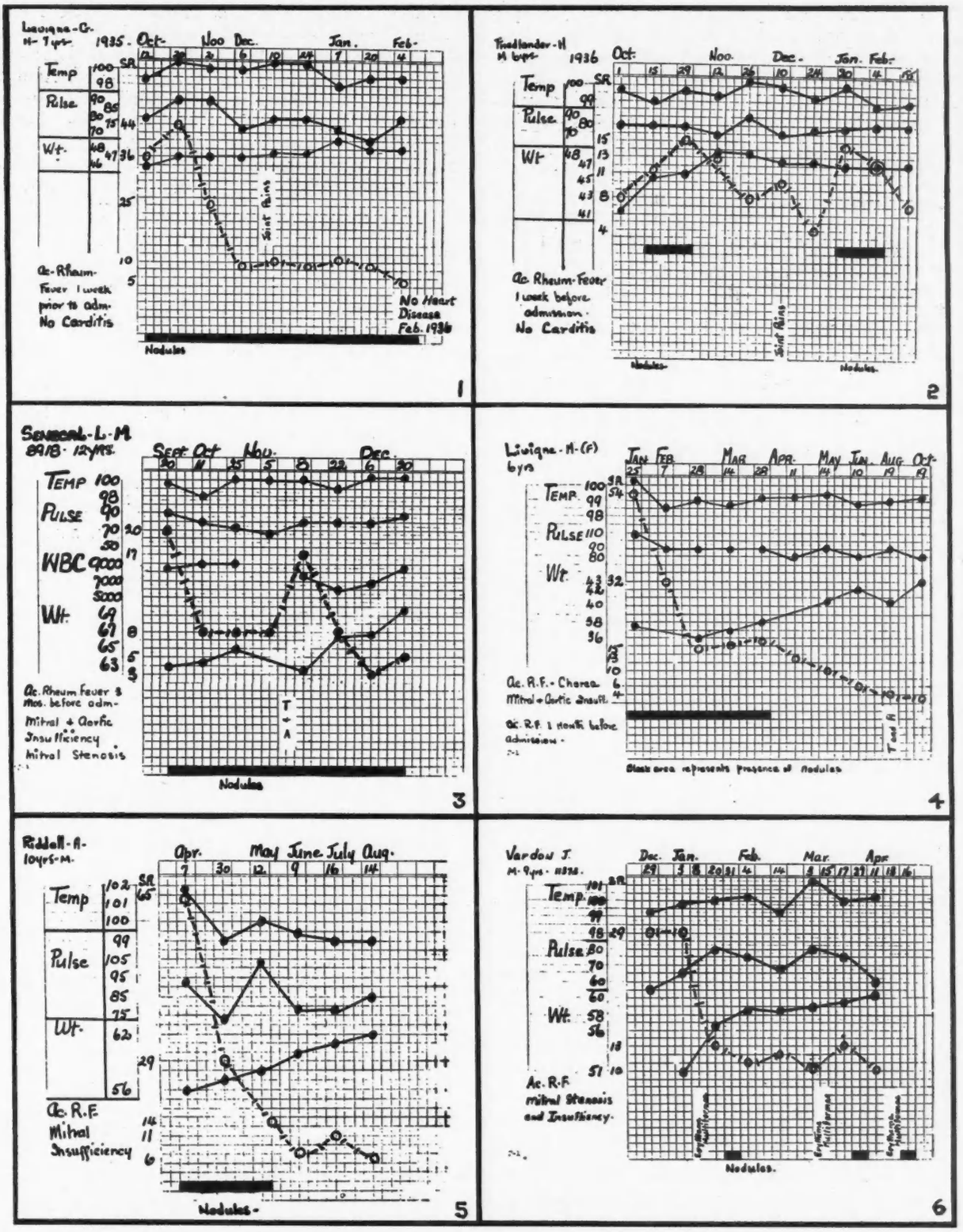

Chart 1. Nodules with Rheumatic Fever.—The presence of nodules occurred during a falling sedimentation rate. Joint pains caused no rise of sedimentation rate in the presence of nodules. **Chart 2. Nodules with Rheumatic Fever.**—Note fall of sedimentation rate with occurrence of nodules. Here joint pains without nodules found the sedimentation rate rising. **Chart 3. Nodules and Acute Rheumatic Fever with Carditis.**—Acute rheumatic fever occurred three months before admission. Note the presence of nodules occurring when the sedimentation rate begins to fall. **Chart 4. Nodules and Acute Rheumatic Fever with Chorea and Carditis.**—Acute rheumatic fever occurred one month before admission. Note the presence of nodules occurring when the sedimentation rate begins to fall. **Chart 5. Nodules with Acute Rheumatic Fever with an established Mitral Insufficiency.**—The latter not re-activated. Nodules again occurring during subsidence of the infection. **Chart 6. Nodules with Acute Rheumatic Fever, Carditis and Erythema Multiforme.**—Erythema multiforme in the presence of nodules usually is associated with a normal sedimentation rate.

Note.—In the above charts the 1st solid line represents the rectal temperature; the 2nd the sleeping pulse; the 3rd the white blood cells; the 4th the body weight; the broken line represents the sedimentation rate at the end of the first hour (values over 12 mm. can be considered abnormal). The solid black line indicates the presence of nodules.

During the eight years under review, 464 patients were admitted to our rheumatism service, of whom 38 cases developed recognizable rheumatic nodules; of these cases 16 were female and 22 were male. From a review of these 38 cases of rheumatic fever who developed nodules, we wish to modify the somewhat optimistic opinion previously expressed.

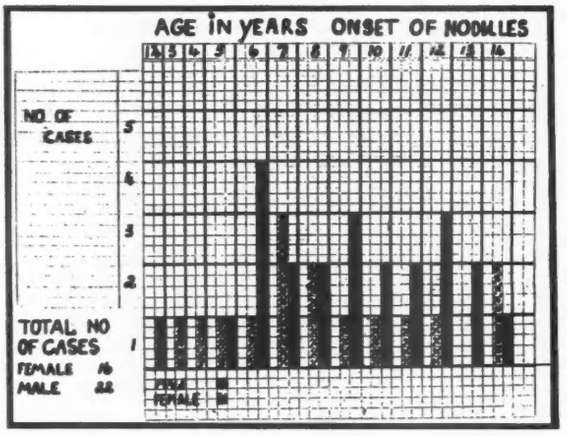

Chart 7. Age Incidence of Nodules.—Males—indicated by solid blocks, females by broken blocks. It is of interest that there are more female children in the "lower age" group, from one to six years. This corresponds with the fact that carditis, associated with acute rheumatic fever, in the "lower age" group, occurs more frequently in females than in males.

These children have been followed from two to seven years, and all have been reviewed within the last six months as regards their clinical status, and the findings are summarized in the following tables.

In this group of 22 male patients, all had acute rheumatic fever. The age of onset of nodules here was later than those seen in the females. There were six cases of acute rheumatic fever who showed no associated carditis. Of the type of carditis, as determined clinically and by other criteria, 16 had mitral insufficiency, associated with stenosis in 11 cases, and associated with aortic disease in another nine cases. Three carditis cases had an associated erythema multiforme and one uncomplicated case of rheumatic fever also had erythema multiforme. Chorea also occurred in three of the carditis cases. One patient developed auricular fibrillation under observation and one died.

In this group of 16 female cases, all had acute rheumatic fever. The age onset of nodules was earlier than in those seen in the males, probably accounting for the fact that no case of rheumatic fever occurred without carditis, except one which developed chorea. Of the type of carditis as determined clinically and by other criteria, 15 had mitral insufficiency, nine also had mitral stenosis, and in another five cases aortic disease was also present. The more severe complications were more apparent in this group, three of whom developed pericarditis and one became decompensated. Four carditis cases had an associated erythema multiforme, two died and one was moribund on discharge.

From the above, it is suggested that the appearance of nodules in a child with rheumatic disease suggests the subsidence of this specific rheumatic incident, but that its association with severe degrees of carditis of which the prognosis can be statistically determined, according to the patient's age, cannot be denied.

During the course of this study, 9 cases of erythema multiforme were encountered in this same group of 464 patients. In only one case was erythema multiforme encountered without

TABLE I.

NODULES WITH OTHER MANIFESTATIONS—(MALES)

Male	*Age of onset of nodules*	*Acute rheumatic fever*	*Chorea*	*Mitral insufficiency*	*Mitral stenosis*	*Aortic insufficiency*	*Erythema multiforme*	*Auricular fibrillation*
	years							
1	5	x	..	..	..	..	..	..
2	6	x	..	x	x	x	..	..
3	6	x	..	x	..	..	..	..
4	6	x	..	..	..	..	..	..
5	6	x	..	x	x	x	..	..
6	7	x	..	x	x	..	x	..
7	7	x	..	x	..	x	..	..
8	8	x	..	x	..	x	..	..
9	8	x	..	x	x	x	..	..
10	9	x	..	..	..	..	..	..
11	9	x	..	x	..	..	..	..
12	9	x	..	x	x	..	x	..
13	10	x	..	x	..	..	..	..
14	10	x	x	x	x	..	x	..
15	11	x	x	x	x	x	..	..
16	11	x	..	x	x	x	..	x
17	12	x	..	..	..	..	..	..
18	12	x	..	x	x	x	..	..
19	12	x	x	..	x	..	..	..
20	13	x	..	x	x	x	..	Died
21	13	x	..	..	..	..	..	..
22	14	x	..	..	..	..	x	..

TABLE II.

NODULES WITH OTHER MANIFESTATIONS—(FEMALES)

Female	Age of onset of nodules	Acute rheumatic fever	Chorea	Mitral insufficiency	Mitral stenosis	Aortic insufficiency	Pericarditis	Decompensated	Erythema multiforme	Died
	years									
1	1½	x	..	x	x	..	..	..	..	..
2	3	x	..	x	..	..	..	..	..	..
3	4	x	..	x	..	..	..	..	..	..
4	5	x	x	..	..	..	..	..	..	..
5	6	x	..	x	x	x	..	..	x	..
6	7	x	..	x	x	x	x	x	..	..
7	7	x	..	x	x	..	..	..	..	..
8	7	x	..	x	x	x	..	..	..	x
9	8	x	..	x	x	..	x	..	..	..
10	8	x	x	x	x	..	x	..	x	..
11	9	x	..	x	..	..	..	..	x	..
12	10	x	..	x	x	x	..	..	..	x
13	11	x	..	x	x	..	..	..	..	Moribund
14	12	x	..	x	..	..	..	..	..	..
15	14	x	..	x	..	..	..	..	x	..
16	14	x	..	x	..	x	..	..	..	..

the presence of rheumatic nodules; in only one case was erythema multiforme discovered without the presence of evidence of cardiac disease. On the basis of this limited experience, we have the temerity to suggest that the presence of erythema multiforme in a child suffering from rheumatic infection has a very serious prognostic import, in fact, as serious as the evidence of rheumatic nodules.

CONCLUSIONS

Thirty-eight cases of the manifestation known as the rheumatic nodule were found in the study of 464 admissions to the Rheumatism Service of the Children's Memorial Hospital during the years 1933 to 1940, inclusive.

The presence or absence of associated cardiac disease, and its probable severity, is discussed. From this it would appear that the appearance of rheumatic nodules in a child suffering from rheumatic infection suggests that the particular rheumatic incident in the life-long infection is probably subsiding, but that the prognosis is of eventual severe cardiac disease and a grave outlook.

The finding of 9 cases of erythema multiforme in this same group of patients, and eight associated with a severe degree of heart disease, would, on the basis of this very limited experience, suggest also a serious prognosis.

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Medical War Relief Fund

The Honorary-Treasurer has received the following letter from the British Medical Association. There have been previous acknowledgments particularly in regard to the generosity of the British Columbia Division.

"Dear Dr. Lewis,

It is a great pleasure to acknowledge receipt of your letter of December 30th and the enclosed draft for £143.3.5. for the Medical War Relief Fund. I note that this contribution includes some very generous donations from individual practitioners, as well as handsome sums subscribed by the Quebec Division of the C.M.A. and the Victoria County Medical Society. To all who have so kindly helped I wish to express the sincere gratitude of the Committee of the Fund.

Appeals for assistance from the Fund are bound to become increasingly numerous but the response from the profession at home and overseas encourages us to believe that we shall be able to provide adequately for every case of need.

I enclose the official receipt for your draft.

Yours sincerely,

G. C. ANDERSON,

February 9, 1942. *Honorary-Treasurer.*"

Contributions to the Fund are announced in the *Journal* each month. Since publication of the March issue the following have been received:

Individual subscriptions from Saskatchewan..	$ 50.00
Alberta Division	628.03
Noonday Club of Western Ontario.....	25.00

Total transfers to the Fund up to March 18th amount to $4,925.71.

Association Notes

THE SEVENTY-THIRD ANNUAL MEETING of the Canadian Medical Association

TO BE HELD IN JASPER PARK, JUNE 15, 16, 17, 18, 19, 1942

Convention Headquarters—Jasper Park Lodge

President - - - DR. GORDON S. FAHRNI, Winnipeg
President-Elect - - DR. A. E. ARCHER, Lamont
General Secretary - - DR. T. C. ROUTLEY, Toronto

As previously announced, detailed arrangements for the Seventy-third Annual Meeting, to be held in Jasper Park Lodge during the week of June 15th next, are progressing most satisfactorily. In this issue is presented the first draft of the scientific program.

General Council, according to custom, will meet on Monday and Tuesday.

On Tuesday afternoon, the annual Business Meetings will be held by the following Divisions of the Association: British Columbia, Saskatchewan and Alberta. It is with considerable satisfaction that we find the three Westerly Divisions holding their annual business meetings concurrently with the national meeting, manifesting a splendid degree of co-operation.

Round Table Conferences occupy the first session of the program on the mornings of Wednesday, Thursday and Friday. The balance of the mornings is given over to General Sessions, while the afternoons are taken up by Sectional Meetings.

The Annual General Meeting will be held on Wednesday night.

The Committee on Medical Economics is preparing a program for Thursday night.

Golfers and all those who try to play golf are reminded that the Golf Tournament will be held on Tuesday, when play for the magnificent Ontario Cup and other prizes will take place.

Golfers will also be interested in the new Golf Trophy donated by the Alberta Division for annual inter-provincial competition.

As already announced, the special convention rates which include travel and maintenance, provide four days' board and lodging at Jasper Park. Special per diem rates are also available, as published in the March issue of the *Journal*.

GENERAL SESSIONS

(Speakers and Subjects as Arranged to Date)

Dr. Gordon S. Fahrni, Winnipeg
Presidential Address.

Dr. Alan Brown, Toronto
Essential features concerning the proper nutrition of the infant and child.

Dr. J. G. Cunningham, Toronto
Industrial Medicine.

Dr. Lloyd Morgan, Toronto
Common eye diseases, diagnosis and treatment (illustrated by kodachrome slides).

Dr. H. K. MacDonald, Halifax
(Subject to be announced).

Dr. Paul O'Leary, Rochester, Minn.
The treatment of psoriasis (illustrated with coloured motion pictures).

Dr. C. D. Parfitt, Toronto
The Osler Lecture.

Dr. Carleton B. Peirce, Montreal
Recent improvements in the x-ray diagnosis of non-tuberculous pulmonary diseases by means of bronchography.

Dr. W. G. Penfield, Montreal, and
Dr. William Cone, Montreal
Head injuries in war.

Dr. R. E. Wodehouse, Ottawa
National health as a post-war problem.

Dr. George S. Young, Toronto
History taking.

SECTIONAL MEETINGS

Section of Anæsthesia

Dr. D. C. Aikenhead, Winnipeg
Mortality and morbidity following surgery in a large general hospital.

Dr. S. W. Johns, Calgary
Intravenous anæsthesia.

Dr. Digby Leigh, Montreal
Oxygen therapy and resuscitation.

Section of Anæsthesia—*Continued*

Dr. E. H. Watts, Edmonton
Continuous spinal anæsthesia.

Section of Dermatology

Dr. J. F. Burgess, Montreal
Vitamins in dermatology.

Dr. D. E. H. Cleveland, Vancouver
The treatment of pruritus ani.

The program for the Section of Military Medicine will appear in the next issue of the Journal.

Section of Dermatology—*Continued*

Dr. A. M. Davidson, Winnipeg
Recurring vesicular eruptions of the hands.

Dr. A. G. Duncan, Calgary
Lupus erythematosus.

Dr. L. P. Ereaux, Montreal
Ointment bases.

Dr. Paul O'Leary, Rochester, Minn.
Dermatoscleroses (illustrated with coloured motion pictures).

Dr. Donald H. Williams, Vancouver
The rôle of the medical profession in venereal disease control in British Columbia.

Dr. G. S. Williamson, Ottawa
Sarcoidosis; systemic and cutaneous manifestations.

Dr. Norman Wrong, Toronto
The weather and the patient's skin.

Section of Historical Medicine

Dr. M. M. Cantor, Edmonton
The social history of medicine — a commentary on newer trends.

Dr. H. E. MacDermot, Montreal
Jerome Cardan.

Dr. Ross Mitchell, Winnipeg
William Smellie.

Dr. A. R. Munroe, Edmonton
Baron Larrey, Surgeon General to the army of Napoleon.

Dr. E. P. Scarlett, Calgary
The medical sources of Dr. Jekyll and Mr. Hyde.

Dr. G. D. Stanley, Calgary
Dr. Michael Clard.

Dr. J. A. Valens, Saskatoon
The trails of the early doctors in the central prairies.

Section of Medicine

Dr. Gerard Allison, Winnipeg
Some obscure pains.

Dr. A. H. Baker, Calgary
The recognition and management of the early apical lesion.

Dr. Eldon M. Boyd, Kingston, and
Dr. W. Ford Connell, Kingston
Lipæmic hyperthyroidism.

Dr. Ford Connell, Kingston
Digitalis, its uses and misuses.

Dr. H. K. Detweiler, Toronto
Bromide intoxication.

Dr. George C. Hale, London
Œdema.

Dr. E. P. Scarlett, Calgary
Silicosis.

Section of Medicine—*Continued*

Dr. J. W. Scott, Edmonton
Climatic factors in disease.

Dr. Harold N. Segall, Montreal
The interpretation of faint heart sounds.

Dr. P. H. Sprague, Edmonton
Some common functional diseases of the intestines and their management.

Dr. G. F. Strong, Vancouver
Cardiac pain.

Dr. Donat Voghel, Montreal
Vocational guidance, occupational adjustment and medicine.

Section of Obstetrics and Gynæcology

Dr. J. E. Harrison, Vancouver
Sterility in the female.

Dr. W. S. Holmes, Saskatoon
The management of the third stage.

Dr. J. D. McQueen, Winnipeg
The treatment of fibroids of the uterus.

Dr. Arthur Nash, Victoria
Breech presentation.

Dr. E. M. Robertson, Kingston
Vaginal discharge, diagnosis and treatment.

Dr. J. R. Vant, Edmonton
A five year summary of maternal deaths in Alberta.

Dr. H. B. VanWyck, Toronto
Antepartum hæmorrhage.

Section of Ophthalmology

Dr. Charles E. Davies, Vancouver
Vertical phorias, operative and non-operative.

Dr. R. J. P. McCulloch, Toronto
Difficulties and complications in senile cataract operations.

Dr. Fulton Risdon, Toronto
One of the phases of plastic surgery of the eyelids.

Dr. A. E. Shore, Calgary
Recent advances in medical therapy of the eye.

Section of Otolaryngology

Dr. Keith Hutchison, Montreal
The sinus problem.

Dr. F. D. McKenty, Winnipeg
Recent advances in medical therapy in diseases of the ear, nose and throat.

Dr. Joseph A. Sullivan, Toronto
Surgery of the mastoid.

Dr. G. E. Tremble, Montreal
Headache of nasal origin.

Dr. A. L. Yates, Calgary
Sudden deafness.

Section of Pædiatrics

Dr. A. E. M. Cairns, Lethbridge
Second year anæmias.

Dr. Gordon Chown, Winnipeg
Allergic problems.

Dr. O. J. Day, Winnipeg
Progress in poliomyelitis.

Dr. R. P. Kinsman, Vancouver
Prevention of bullous impetigo in hospital nurseries.

Dr. Harry Medovy, Winnipeg
Clinical study of western variety encephalitis occurring in young infants.

Dr. H. W. Price, Calgary
Convulsions.

Dr. Nelles Silverthorn, Toronto
Meningitis.

Dr. G. E. Swallow, Edmonton
Anorexia of childhood.

Section of Radiology

Dr. M. M. R. Hall, Toronto
An analysis of carcinoma of the colon, commenting on the accuracy of radiological diagnosis.

Dr. B. J. Harrison, Vancouver
Remarks on the nature of cancer.

Dr. M. C. Morrison, London
Primary tumours of the bone.

Dr. Carleton B. Peirce
(Subject to be announced).

Dr. J. E. Perron, Quebec
(Subject to be announced).

Dr. S. M. Rose, Lethbridge
Luetic disease of the bone.

Section of Surgery

Dr. R. L. Anderson, Edmonton
Failures in inguinal hernia.

Dr. J. K. Fife, Edmonton
Indications for thyroidectomy in the presence of a normal basal metabolic rate.

Dr. R. I. Harris, Toronto
Spondylolisthesis.

Dr. H. H. Hepburn, Edmonton
The surgical treatment of congenital hydrocephalus.

Dr. F. I. Lewis, Toronto
The management of un-united fractures of the neck of the femur.

Dr. F. H. H. Mewburn, Edmonton
Surgical care of poliomyelitis.

Dr. H. V. Morgan, Calgary
Clinical application of present day knowledge of surgical shock.

Dr. M. R. MacCharles, Winnipeg
The early diagnosis of cancer.

Section of Surgery—*Continued*

Surgeon Lieutenant Commander Walter C. MacKenzie, R.C.N.V.R., St. John's, Nfld.
Surgical problems of the navy.

Dr. Norman B. Taylor, Toronto
Physiological problems in intestinal obstruction.

Dr. R. G. Townsend, Calgary
Surgical principles in compound fractures.

Dr. M. A. R. Young, Lamont
Present status of duodenal ulcer surgery.

Section of Urology

Dr. N. E. Berry, Kingston
Management of vesical neck obstruction.

Dr. Gordon Ellis, Edmonton
Renal tuberculosis — presentation of two interesting cases.

Dr. A. W. Hunter, Vancouver
Treatment of urinary infections.

Dr. H. D. Morse, Winnipeg, and
Dr. C. B. Stewart, Winnipeg
Strictures of the ureter.

Dr. R. A. McComb, Toronto
Further results in uretero-intestinal anastomosis.

Dr. Frank S. Patch, Montreal
(Subject to be announced).

Dr. Frederick Pilcher, Calgary
Retroperitoneal tumours in children.

ROUND TABLE CONFERENCES

Subjects and Chairmen

Joint Conference Including all Sections

The use and abuse of vitamins
Dr. F. F. Tisdall, Toronto.

Anæsthesia

Problems of respiration and anoxæmia
Dr. D. C. Aikenhead, Winnipeg.

Dermatology

Syphilis
Dr. Donald H. Williams, Vancouver.

Dermatology and Radiology

Cutaneous cancer
Dr. Harold Orr, Edmonton.

Medicine

Recognition and treatment of poliomyelitis in general practice
Dr. J. D. Adamson, Winnipeg.

The selection of sulfanilamide and related compounds in medical treatment
Dr. Duncan Graham, Toronto.

Obstetrics and Gynæcology

Rational endocrine therapy in obstetrics and gynæcology
Dr. Ross Mitchell, Winnipeg.

The treatment of prolapse
Dr. J. R. Vant, Edmonton.

Pædiatrics

Pædiatric prevention of future foot disorders
Dr. Graham Huckell, Edmonton.

Adolescent problems
Dr. A. Howard Spohn, Vancouver.

Radiology

Radiotherapy of non-malignant diseases
Dr. B. J. Harrison, Vancouver.

Presentation and discussion of interesting films
Dr. W. H. McGuffin, Calgary.

Surgery

Principles and practice in wound treatment
Dr. C. W. Burns, Winnipeg.

Problems in bile tract surgery
Dr. Roscoe R. Graham, Toronto.

Urology

Urinary complications following rectal surgery
Dr. Frank S. Patch, Montreal.

Hospital Service Department Notes

Hospital Rates Not to be Fixed by Federal Control Regulations

In the February issue, pp. 182-183, a number of the decisions of the Wartime Prices and Trade Board, the Department of Munitions and Supply and other Boards as they affect hospitals were reviewed. Since that date one important ruling, that affecting room rates, has been revised and other additional rulings have been made.

Rates.—After representation by the hospitals, it has been ruled that the inclusive rates for rooms are not to be subjected to a ceiling. Hospitals have experienced a jump in the cost of operation far exceeding that of the official "index of the cost of living" because of the sharp increase during the war in the cost of certain drugs, instruments and various articles, a large percentage of which are imported. Most of the hospitals had not increased their rates, as had been the customary practice in business and industry. As a result many hospitals have reported that, having no reserves of profits, they could not carry on at the old rates.

The Administrator of Services, Mr. James Stewart, has ruled that "inclusive rates charged by hospitals covering the various services rendered, including meals, are exempt from the provisions of the Maximum Prices Regulations; except that the prices charged for meals served to doctors and visitors or charged for meals and/or room rent to nurses who may or may not be in residence, are not so exempt and that the prices of such meals and/or room rent may not be increased above the prices charged during the basic period established by the Regulations, *viz.*, September 15 to October 11, 1941, without the consent of this Administration."

Hospitals are being urged by the Canadian Hospital Council to practise every possible economy so that it may be possible to avoid raising room rates, or, if an increase be necessary, such be kept as low as possible.

Rubber gloves.—The reduced supply of gloves and other rubber goods in hospitals will be quickly noted by surgeons. The supply of rubber goods for "medical, surgical and laboratory use" will be continued but only up to 50 per cent of the former consumption. With the losses in the Far East, this quota may be even further reduced. This means fewer new gloves, more patched gloves and greater care in the use of gloves. Hospitals are being urged to take the greatest possible care in the handling, sterilization and storing of rubber, for it is generally conceded that most rubber is prematurely destroyed by careless handling and not by being worn out. This applies also to hot water bottles, tubing, sheets and other rubber products. The *Canadian Hospital* for March contains a valuable article on the care of rubber goods.

Rubbing alcohol. — In February it was announced that denatured alcohol was to be controlled. Every purchaser must have a permit to buy it and is not to buy more than a month's supply at a time. The Controller of Chemicals has ruled that this does not apply to rubbing alcohol, SDAG 1A, but only to wholly denatured alcohol or alcoholic anti-freeze. Hospitals now have permits to purchase rubbing alcohol. Those buying anti-freeze through a jobber (and we presume this applies to doctors and others) will not require a permit as the jobber must have a permit.

Construction to be licensed.—Any person constructing, remodelling or repairing a building must obtain a licence from the Construction Controller if the *over all* cost exceeds $5,000. This includes dwellings, offices, hospitals and everything but Federal construction. Also any machinery or equipment costing more than $5,000, including the cost of installation, must be covered by a licence. This figure may be reduced if the shortages increase. The Controller may order the substitution of materials or alter the method of construction. In actual practice, very little but Federal construction is likely to occur for some time as it has become exceedingly difficult to obtain materials, particularly hardware, plumbing and other fabricated articles.

The General Secretary's Page

This is in the nature of an experiment originating in the minds of the Assistant Editor and myself. How long it may last, or what value it may be, I cannot say. Dr. MacDermot expressed the idea to me in this way: "You are the main personal link which the Association has with the profession across Canada and with the world outside. Why not use the pages of the *Journal* to give expression in a personal way to the activities of the Association as you see and know them?" Some such thought had been in my mind for a long time, so I agreed.

It may be that members will have some views about matters which should be discussed on this page. If so, please tell me.

The most dominant thought in the minds of all of us at this time is the war. You already know that, in September, 1939, the Association offered its services to the Government in any way we could help. A national survey was made to indicate our available manpower and Advisory Committees, central and provincial, were organized. We have tried to the best of our ability to be useful, and friendly relationships have been established between the Association and the military authorities; but as our functions are entirely voluntary in character, we have sometimes questioned just how effective our services have been. We are most anxious, however, to co-operate in every possible way.

We are officially informed that Canada's fighting forces require 800 additional Doctors this year—600 for the Army and 200 for the Navy and Air Force. If you are under forty-five years of age, physically fit, ready to serve anywhere, and feel that you can be spared from your present post, go to the nearest D.M.O. and sign up; and, if you are between 45 and 55, there is room also for a limited number for service here in Canada.

One hears many doctors say, "Why does not some one in authority come out and give us a clarion call? If they do, the medical profession of Canada will respond just as nobly as they did in 1914 to 1918." We have no authority to speak for the Government, but we have agreed to send another appeal to every doctor in Canada by way of a questionnaire. When you receive yours read it carefully, and answer it promptly. It may be in your hands before this page is read. To repeat, Canada's fighting services require 800 additional medical officers this year. The medical profession must not, and will not fail.

At our annual meeting in Winnipeg last June, we were told that Ottawa was making headway in the writing of health insurance legislation. Since that time, rumours have been flying thick and fast. Happily, Dr. Heagerty in this issue presents the facts very frankly. The air should now be cleared. But the notice served last June has not been lost upon the medical profession. Throughout Canada, the nine Divisions of the Canadian Medical Association are busy crystallizing their views and opinions on the principles which should be incorporated in any health insurance legislation. We do not know when such legislation may be introduced but certainly there is every good reason why we should put our own house in order now.

With particular reference to this important subject, I have begun a tour of Canada. I have already attended meetings in Ontario, Quebec, Nova Scotia and New Brunswick. By the time this page is printed, I shall have visited the four Western Divisions. Unfortunately, while in the East in February, bad weather prevented my getting to Prince Edward Island. The ferry was ice bound and the planes were grounded; but we did have a chance to talk some matters over by long distance telephone between Moncton and Charlottetown.

I was greatly impressed with the thoroughness by which the Divisions are tackling the study of this problem. The Committee on Inter-Relations and Medical Economics of the Ontario Division spent a long day with the subject, with a large attendance present from all parts of the province. Twenty-five members of the Executive Committee of the Nova Scotia Division met in Halifax on February 25th and they, too, are missing no opportunity of canvassing this important problem from every point of view. I was greatly pleased also with the meetings in Saint John, Fredericton and Montreal, finding in each place groups of men keenly interested in studies relating to health insurance. In next month's *Journal*, this page will speak of my visit to the four Western Divisions. The Canadian Medical Association has a real job on its hands in the field of Medical Economics. Let us hope that, when and if health insurance legislation is before Parliament, we shall be found ready and united—so strongly united and so well informed that we can approach our task with confidence.

T. C. ROUTLEY,
General Secretary.

The War

First Canadian Division Medical Society

The First Canadian Division Medical Society has now had three meetings in its second year. The eleventh monthly meeting consisted of a clinical day spent at 1 Canadian Neurological Hospital where Col. Van Nostrand was our host for the day. Coffee on arrival was followed by a morning of short papers by various members of the staff, and then a buffet luncheon on the piazza of the Officers' Mess overlooking their beautiful grounds. During the afternoon the Society split in two sections and cases were demonstrated on the surgical and medical sides of the hospital. The day came to a delightful conclusion with tea served in the nursing sisters' residence.

The twelfth meeting was held at the Officers' Mess of B Company of the 5th Field Ambulance. The speaker was Brigadier Mitchener, D.D.M.S. Anti-aircraft Command, England, who gave a most interesting hour's talk based on his experiences with medical services in Norway and in England during this war.

The D.M.S. has again this year granted authority for all medical officers who have been in England for a year or longer, to take four weeks' courses in a subject of their own choosing at any of the civilian or military hospitals in Great Britain. These courses were much appreciated last winter, and all medical officers are looking forward to picking up some of the traces of their specialties again this year.

New Methods in Treatment of Schizophrenia

In making economies on sugar and insulin for the treatment of people who, like Jekyll and Hyde, have schizophrenia, or "split" minds, British medical men have found that new methods, now tried out over a whole year, give better results. No sugar is now used, and the consumption of insulin has been reduced by over a quarter.

Normally, schizophrenia is treated by injecting insulin into the muscles, and when the patient falls into a coma he is fed with sucrose; on waking he is given sweetened drinks. In this way each patient requires one pound of sugar a day, whereas the ration allowance is only ½ lb. per week.

Although a certain amount of extra sugar was eventually allowed the doctors determined to find a more economical method of treatment. After unsuccessful attempts on smaller quantities of sugar, it was found better to replace the sugar entirely by potatoes mashed into a thin soup with milk and water, a pint of this being fed after the patient had been brought out of the coma with an injection of 20 c.c. of glucose (33 per cent).

Patients now recover rapidly from the coma, and within one to three minutes they are able to answer questions and drink the soup, which they much prefer to the sugar drink. What is more, there has since been not one instance of the vomiting which was quite common with sugar.

Then attention was turned to economy of insulin. Instead of administering it by the intramuscular method, they tried injecting it into the veins and found that by doing so, not only could they reduce the amount given from 117 to 84 units (averaged over 24 patients), but the coma produced was much quieter and there were no relapses after treatment.

In this way there was a saving of 84 lb. of sugar a week, or about 16 cwt. over the year, as well as 23.8 per cent of the insulin used.

NOTE.—This work has been carried out at the Warlingham Park Hospital, Surrey, by James S. McGregor, M.D., Ch.B., D.P.M., and R. A. Sandison, M.B., B.S., and particulars are issued by permission of the Medical Superintendent, Dr. T. P. Rees.

The details have been sent us by the Industrial Publicity Unit, Mowbray House, Norfolk St., London.

War Literature

BRITISH MEDICAL JOURNAL

Medicine and Aviation (leading article), 1941, **1:** 879.

An Improved Method of Regional Anæsthesia in Acute Abdominal Surgery, N. R. James and H. W. Burge, 1941, **1:** 907.

CANADIAN MEDICAL ASSOCIATION JOURNAL

The Bacteriology of Recently Inflicted Wounds with Special Reference to the Hæmolytic Streptococci and Staphylococci, R. Hare and R. E. Willits, 1942, **46:** 23.

A Review of Medical Boards, R. W. I. Urquhart, 1942, **46:** 54.

Canada's Supply of Army Doctors, W. J. Deadman, 1942, **46:** 60.

The Need for Medical Officers by the Defence Services (editorial), 1942, **46:** 69.

Bombs and Bombing as Health Agents (editorial), 1942, **46:** 70.

Training and Efficiency (editorial), 1942, **46:** 71.

Crush Syndrome, H. R. Robertson and W. H. Mathews, 1942, **46:** 116.

THE LANCET

Treatment of Experimental Gas Gangrene with Plaster Immobilization and Chemotherapy, G. B. Reed and J. H. Orr, 1941, **1:** 376.

Some Problems of Wound Infection, A. A. Mills, 1941, **241:** 507.

Treatment of Air-raid Casualties, J. A. Shepherd, 1941, **241:** 785.

The Dyspeptic Soldier, W. Brockbank, 1942, **242:** 39.

War Wounds of the Chest, R. Coote, 1942, **242:** 148.

WAR MEDICINE

Local Chemotherapy and Experimental Gas Gangrene, G. B. Reed and J. H. Orr, 1942, **2:** 83.

BOOKS AND PAMPHLETS

The Treatment of Burns, H. N. Haskins, C. C. Thomas, Springfield, Ill., 1942, price $6.50.

Skin Grafting, E. C. Padget, C. C. Thomas, Springfield, Ill., 1942, price $4.50.

Chirurgie Reparatrice et Correctrice des Teguments et des Formes, L. Dufourmentel, Masson et Cie, Paris, 1941, price $3.00 (paper cover).

Medical Societies

Montreal Physiological Society

The monthly meeting of the Montreal Physiological Society was held on February 16, 1942, at McGill University. The following papers are abstracted herewith.

PHENOTHIAZINE AS AN ENZYME INHIBITOR AND AS A HÆMOLYTIC AGENT.—H. B. Collier, Institute of Parasitology, Macdonald College.

In addition to enzyme inhibitions previously described, it was reported that phenothiazone strongly inhibits the cholinesterase activity of horse serum. This was related to the anthelmintic action of phenothiazine. Serum lipase was not affected.

In connection with the anæmia produced by phenothiazine in horses it was demonstrated, by the technique of Ponder, that phenothiazone accelerates hæmolysis of erythrocytes in the presence of saponin or of lysolecithin. Serum neutralizes this hæmolysis. No photodynamic hæmolysis was observed in the presence of phenothiazone.

PHYSIOLOGICAL MECHANISMS UNDERLYING THE FORMATION OF URINARY CALCULI AND NON-OPERATIVE TREATMENT BASED THEREON.—J. F. McIntosh, University Clinic, Royal Victoria Hospital.

None of the unitarian theories put forward to explain stone formation are adequate. From the chemical standpoint, there are four principal types of stones containing uric acid, cystine, calcium salts and magnesian salts respectively. Each of these types of stone is formed as a result of a separate mechanism, which allows precipitation of the stone-forming constituents from solution. The chemical analysis of 100 stones from clinical cases strongly supports this hypothesis. The organic stones, and 15 per cent of the calcium stones, may be successfully treated by acid or alkali therapy. Some of the magnesian stones may be expected to yield to antibacterial measures.

CARCINOGENIC ACTIVITY OF A BENZENE EXTRACT OF FÆCES FROM CANCER PATIENTS.—R. L. Noble, O. F. Denstedt, J. B. Collip, Research Institute of Endocrinology and Department of Biochemistry, McGill University.

Following the reports by Menke and Steiner that extracts of human cancer and livers from cancer patients produced sarcoma when injected into mice, experiments were started to test extracts of fæces from cancer patients. The material was collected under acetone and then dried. The acetone residue and dried fæces were then extracted with benzene. After removal of the benzene the residue was dissolved in sesame oil. In one mouse 11 months following a single injection of the extract, a tumour developed at the injection area. On section this showed a spindle cell sarcoma. At present tumours are present in 2 other mice injected with fæces extract. Two mice show tumours following the injection of an extract of ascitic fluid from a case dying of cancer. The fæces extracts were tested for the Haddow effect on transplanted Walker tumours. In 12 controls—no regressions occurred whereas in the injected animals 5 tumours in 13 cases completely regressed and the rats resisted subsequent reinoculation. The material used for extraction was collected through the courtesy of Dr. A. D. Campbell.

A paper was also read on STABILITY OF HÆMOGLOBIN DURING STORAGE.—I. Rochlin (introduced by O. F. Denstedt) Department of Biochemistry, McGill University.

R. L. NOBLE,
Secretary.

La société médicale des hôpitaux universitaires de Québec

Une séance de cette Société eut lieu à l'Hôtel-Dieu de Québec vendredi le 19 décembre 1941, à 8.30 heures du soir.

A PROPOS D'UN CAS D'EMBOLIE PULMONAIRE.—Fernando Hudon.

M. E.M., âgé de 41 ans, entre à l'hôpital pour fracture de la jambe qui est réduite et immobilisée dans un plâtre, sous anesthésie générale au pentothal. Six jours après son admission, le malade fait un petit infarctus pulmonaire. Huit jours plus tard, à l'occasion d'un nouveau plâtre, notre patient fait une nouvelle embolie pulmonaire sans syndrôme douloureux. Malgré l'adrénaline, la morphine et la coramine, par voie sous-cutanée, il cesse de respirer dix minutes plus tard et ne donne plus signes de vie. On le ranima à l'aide de l'adrénaline par voie veineuse, la respiration artificielle, et l'inhalation de l'oxygène pur. L'administration de l'oxygène fut nécessaire pendant quatre heures. La douleur qui apparut les jours suivants fut calmée avec des injections d'héroine. Plusieurs recommandent, en face de la crise, les injections intra-veineuses de papavérine et d'atropine à hautes doses en y associant les sympathomitiques et les analeptiques. L'oxygène pur rend de grands services comme le démontre notre cas.

A PROPOS D'UN CAS D'AGRANULOCYTOSE.—J. B. Jobin.

Observation d'un cas d'agranulocytose grave, avec leucopénie à 1071 et absence complète de polynucléaires pendant au moins cinq jours. Guérison par le pentonucléotide combiné aux transfusions et aux injections intra-musculaires d'extrait de foie de veau.

Suit un rappel théorique des idées actuellement en cours sur l'étiologie, la pathogénie, et le traitement de l'agranulocytose.

UN CAS DE POLYPE SOLITAIRE DU COLON SIGMOIDE.—C. Vézina.

Il s'agit d'une femme de 46 ans, qui vient consulter pour des hémorrhagies et des douleurs rectales avec fausses envies d'aller à la selle. Ces troubles durent depuis 4 ans.

Le toucher rectal est négatif; la recto-sigmoidoscopie, jusqu'à 20 centimètres, ne montre aucune tumeur, mais seulement un peu de sang pénètre dans la lumière de l'instrument. La radiographie, après lavement baryté, montre un défaut de remplissage: fécalôme ou polype. Nouvelle radiographie, après insufflation d'air; double contraste: tumeur ayant l'apparence d'un polype situé dans la bouche inférieure du sigmoide.

La parotomie latérale gauche, ouverture du sigmoide, ablation, après ligature du pédicule, d'un polype de la grosseur d'une noix.

L'exploration digitale du colon sigmoide ne montre aucun autre polype. Fermeture transversale du colon. La malade guérit sans incident.

Examen histologique de la tumeur: polype glandulaire, sans trace de malignité.

VOLUMINEUX ABCÈS OTOGÈNE DU LOBE TEMPORO-SPHÉNOIDAL GAUCHE: OUVERTURE ET GUERISON.—P. Painchaud.

L'auteur, après avoir résumé le pathogénie de l'abcès encéphalique d'origine otogène, insiste sur les principaux

symptômes locaux et généraux qui permettent d'en poser le diagnostic et parfois même un diagnostic de localisation. Il attire l'attention sur la tendance du gros abcès encéphalique à se cloisonner; cloisonnement contre lequel doit se diriger le traitement chirurgical.

L'auteur rapporte l'observation personnelle d'un jeune homme de 21 ans, arrivé à l'hôpital inconscient, agité, très pâle, le visage émacié, un pouls à 52, une température rectale à 99.4°, la nuque raide, un écoulement auriculaire gauche abondant et très fétide, une leucocytose sanguine de 10,214 et une leucocytose à polynucléaires (4,800) dans le liquide céphalo-rachidien.

L'évidement pétro-mastoidien pratiqué dans les heures qui suivirent n'apporta que peu d'amélioration et, six jours plus tard, des signes de localisation permirent de poser un diagnostic d'abcès du lobe temporo-sphénoidal gauche. L'ouverture de ce dernier donna issue à un pus grumeleux, fétide et très abondant, à flore microbienne constituée surtout par le pneumo-bacille de Friedländer et le streptocoque non hémolytique.

Plus gros qu'un œuf de poule, à grand diamètre antéro-postérieur, cet abcès fut lavé tous les jours avec une solution au sulfonamide. Dans les semaines qui suivirent les extremités antérieure et postérieure se cloisonnèrent mais ces nouveaux abcès furent facilement atteints grâce à des radio-stéréographies, latérale et frontale, prises antérieurement après injection de lipiodol.

La guérison fut définitive et sans reliquat.

L'auteur insiste, pour terminer, sur les précieux renseignements fournis par l'injection de lipiodol faite après évacuation du pus, injection ne déterminant aucune réaction apparente de la substance cérébrale.

Il fut aussi fort intéressant d'observer les modifications de la flore microbienne, laquelle après avoir été à prédominance de pneumobacilles de Friedländer et de streptocoques dans l'abcès initial est devenue à staphylocoque doré pur dans le pus du cloisonnement antérieur. Serait-ce l'action élective du sulfonamide sur les deux premières sources bactériennes et son peu d'action sur le staphylocoque doré?

La cavité de l'abcès du cloisonnement antérieur fut traitée par des lavages au soluté salin tiède suivis de pulvérisations d'une poudre au sulfathiazole.

Une séance de cette Société eut lieu à la clinique Roy-Rousseau, Québec, vendredi le 6 février 1942.

CONSIDÉRATIONS SUR UN CAS DE FRACTURE DU CRÂNE.—Sylvio Caron et Charles A. Martin.

Après une revue rapide de l'évolution de la thérapeutique des traumatismes crâniens, l'observation d'un cas de fracture de l'étage antérieur de la base du crâne est présenté:

1°—Pour faire ressortir l'inutilité des radiographies précoces et le manque de concordance entre les proportions de la lésion osseuse et les altérations intra-crâniennes;

2°—Pour recommander l'usage diagnostique routinier de la ponction lombaire;

3°—Pour signaler une fistule ethmoidale tardive et persistante;

4°—Pour évaluer les séquelles résultant d'altérations survenues au moment du traumatisme et qu'il n'est plus le temps de prévenir à l'heure du traitement.

CONSIDÉRATIONS SUR CERTAINES CALCIFICATIONS INTRA-CRÂNIENNES.—Mathieu Samson, Sylvio Caron et Gustave Desrochers.

Les auteurs rapportent deux observations de calcifications intracrâniennes.

Dans un cas, il semble s'agir d'une calcification au niveau d'un ancien hématôme sous dural remontant probablement à la naissance. Dans l'autre cas, il s'agit vraisemblablement d'une calcification volumineuse unilatérale au niveau du glomus du plexus choroide droit.

Tout en admettant que la constatation de ces calcifications peut être utile au diagnostic de certaines affections intracrâniennes, il demeure évident que la seule présence d'une calcification intracrânienne sans symptômatologie clinique concomitante n'est pas suffisante pour déterminer la nature du processus pathologique en cause.

TRAITEMENT D'UNE HISTÉRIQUE PAR LE MÉTRAZOL.—Lucien Larue.

Il s'agit d'une jeune fille qui a présenté un syndrôme pithiatique simulant partiellement un syndrôme méningé. Cette jeune fille gardait le lit depuis trois semaines. Traitée par le métrazol, elle a guéri. Cependant, une seconde injection a dû être faite à petite dose, pour déterminer chez elle, la crise d'anxiété que l'on observe chez les malades soumis à ce traitement. Par la suite, sa guérison s'est maintenue. Cette thérapeutique parait susceptible de donner des résultats rapides en pareils cas.

TROUBLES NEURO-VASCULAIRES ET TROPHIQUES À LA SUITE DES TRAUMATISMES DES EXTRÉMITÉS.—Gustave Desrochers.

Les troubles neuro-vasculaires et trophiques à la suite des traumatismes des membres constituent une entité clinique qu'il est possible de rattacher à des lésions du système sympathique, principalement des fibres sympathiques péri-vasculaires. Ces troubles d'origine organique s'associent habituellement à des symptômes d'ordre psychique, car les sujets qui en sont victimes sont des prédisposés, d'un niveau mental inférieur et susceptibles de manifestations hystériformes.

Il faudra s'efforcer de dissocier ces deux éléments du syndrôme post-traumatique et adopter des mesures thérapeutiques conformes aux données du problème: (*a*) Eliminer les facteurs émotionnels et ceux qui découlent de la question d'indemnité chez les assurés et les accidentés du travail. (*b*) Pratiquer la sympathectomie péri-artérielle de façon précoce dans les cas récents et la gangliectomie dans les case plus anciens. (*c*) Faire suivre ces interventions d'une thérapeutique par les agents physiques pour prévenir les ankyloses et les rétractions tendineuses.

Correspondence

Legislation on Health Insurance

To the Editor:

During recent months the subject of health insurance has loomed big in the eyes of doctors, nurses, hospital administrators, dentists and pharmacists, and no doubt misgivings have arisen because of the many and varied rumours that have been in circulation to the effect that the medical and allied professions were to be saddled with a health insurance scheme without consultation. To allay such misgivings, it is thought advisable to give the medical and allied professions the facts.

Last spring the Minister of Pensions and National Health suggested that the subject of post-war public health and medical services be discussed at a meeting of the Dominion Council of Health and representatives of the medical profession and voluntary health organizations with the object of drawing up a post-war public health and medical services plan. The writer was instructed to present and discuss the

subject of present day deficiencies in the field of public health and medical services. As a result of the discussions that took place, it was suggested that studies be undertaken by the writer with the object of formulating a public health and health insurance plan for the Dominion.

Subsequently, by request of the General Secretary of the Canadian Medical Association a meeting of the Executive Committee of that body was held in Ottawa with the Minister and Deputy Minister of Pensions and National Health and the writer, at which a tentative public health and medical services plan was discussed. Following this meeting, the Minister of Pensions and National Health was approached by a committee of the Executive Committee of the Canadian Medical Association with the request that an advisory committee composed of seven members be appointed to assist in conducting the studies and formulating any plan of health insurance that might be developed. By agreement of the Minister, the following Committee of Seven members of the Executive Committee was appointed: Drs. G. S. Fahrni, A. E. Archer, T. H. Leggett, Wallace Wilson, L. Gérin-Lajoie, C. J. Veniot, T. C. Routley. Two meetings have been held. At the first meeting it was agreed that, before any steps would be taken to draw up a Health Insurance Plan, the views of the medical profession would be obtained by the medical committee, through the submission of a questionnaire to the profession. At the second meeting the questionnaire was discussed and approved and it has since been distributed.

Later, committees were formed by the following organizations: Canadian Nurses Association, Canadian Pharmaceutical Association, Canadian Hospital Council, Trades and Labour Congress of Canada, Health Committee of the Canadian Life Insurance Officers Association. In addition, the Canadian Dental Association, agriculture, industry, rural women and urban women have been requested to form study groups. These committees were formed for the reason that, in contemplating any plan of health insurance, the views of all who are affected should be obtained.

On February 5, 1942, "The Advisory Committee on Health Insurance", comprising the following members, was officially created by Order in Council P.C. 836:

Dr. L. C. Marsh, Research Adviser, Department of Pensions and National Health.

Mr. A. D. Watson, Chief Actuary, Department of Insurance.

Mr. J. C. Brady, Chief, Institutional Statistics, Bureau of Statistics.

Mr. S. B. Smith, Chief, Business Statistics, Bureau of Statistics.

Miss M. E. K. Roughsedge, Employment Statistics, Bureau of Statistics.

Mr. J. R. Munro, Chief, Financial Statistics, Bureau of Statistics.

Mr. J. T. Marshall, Chief, Vital Statistics, Bureau of Statistics.

Mr. W. G. Gunn, Departmental Solicitor, Department of Pensions and National Health.

Mr. C. E. Stevens, Employees' Compensation Branch, Department of Transport.

With the writer as the Permanent Chairman.

Why were the medical and allied professions not represented on "The Advisory Committee on Health Insurance"? Because it was considered essential that the medical and allied professions should be unfettered; free to suggest, recommend, approve, disapprove, reject and withdraw from any health insurance plan that did not meet with their approval. Each of the professions participating in the studies will have the privilege of expressing their views freely and frankly.

The duties of "The Advisory Committee on Health Insurance" are to study all factual data relating to health insurance and, in particular, those relating to costs. It was for this purpose that the Committee was confined to Government officials who have statistical information respecting finance, industry, labour, agriculture, employment, unemployment, wage-earning groups, persons with income, indigents, institutional costs, morbidity, mortality, etc., etc.

One scientific adviser on public health was appointed to the Committee. It is, however, the intention to create an advisory committee on public health as it is considered that preventive medicine should play an important part in any plan that may result from the studies being undertaken.

As the medical profession is the most important body concerned with the provision of medical benefits, the Committee of Seven appointed by the Canadian Medical Association is considered the "senior" committee and no steps will be taken by "The Advisory Committee on Health Insurance" without consulting that committee. This is felt advisable because it is known that in no country in which the medical profession has not been fully consulted in the formulation of a health insurance plan has health insurance been an unqualified success. The Committee of Seven have indicated their willingness to co-operate with the writer to the fullest extent and have clearly demonstrated their interest not only in maintaining the high standards of the medical profession but in providing the public with a comprehensive health insurance plan that is in the best interest of the general public.

An endeavour is being made to complete the studies within a period of six months and it is suggested that the medical profession co-operate through the Executive of the Canadian Medical Association and the Committee of Seven to the fullest and bend every effort to that end. It is suggested that during this period of study and planning the *Canadian Medical Association Journal* open its columns to suggestions and

questions from the members of the medical profession in Canada with the object of obtaining a free expression and exchange of views in regard to health insurance so that every member of the profession may feel that he has been given the opportunity to express himself and play a part in the studies and any plan that may eventuate.

(Signed) J. J. HEAGERTY, M.D., C.M., D.P.H.,
Chairman,
The Advisory Committee on Health Insurance,
(Director, Public Health Services),
Dept. Pensions and National Health).
Ottawa, February 21, 1942.

To the Editor:

Dr. J. J. Heagerty of Ottawa kindly let me see his letter on health insurance which you are publishing in this month's *Journal.* I think the medical profession of Canada will be grateful to Dr. Heagerty and also to the Honourable Minister of Pensions and National Health for the publication of such a frank statement at this time. Since June, 1941, many rumours and much conversation have been wafted through the country, a great deal of it disturbing to the medical mind. Happily, by the publication of Dr. Heagerty's letter, all rumours will be dissipated. We now know exactly where we stand. The medical profession of Canada has been given a guarantee that, through the medium of the Canadian Medical Association, the profession will be consulted, not after health insurance legislation has been drafted, but before such legislation sees the light of day.

Dr. Heagerty further makes the position quite clear that the medical profession, in co-operating, is not sponsoring any legislation which may be promulgated. We are not obliged to agree or disagree, which means that consultation at this time in no sense is a committal of the Association to an enactment which might not meet with medical approval.

As pointed out in Dr. Heagerty's letter, a Committee of Seven representing the Canadian Medical Association, has been set up to work in closest co-operation with the Advisory Committee on Health Insurance. The Committee of Seven has asked the medical profession of Canada, through the nine Divisions of the Canadian Medical Association, to set forth their views with respect to principles which should be incorporated in any Health Insurance Act which may be devised. The Committee is taking its task seriously and every doctor in Canada, both within and without the Canadian Medical Association, may rest assured that it will be the Committee's desire to protect the interests of the medical profession and keep them in harmony with adequate medical care rewarded by adequate medical compensation. The insured public must be guaranteed not only complete medical care but care of the very best standards of which the professions are capable. In such a scheme preventive medicine and curative medicine will go hand in hand.

If the medical profession of Canada had enough wisdom at this time to recognize the issues of the day as well as the problems that lie immediately ahead, the Canadian Medical Association would have 100 per cent membership. There are slogans abroad today the mere recitation of which strikes conviction into our hearts: Remember Hongkong! Remember Pearl Harbour! Yes, and to the medical profession one could add another slogan: Remember Great Britain, and remember New Zealand when you think of Health Insurance! And, finally remember this, that, just as surely as day follows night, the time is not far distant when, in high places, these questions will be asked of us: "What is the Canadian Medical Association?", "Whom do you represent?", "What percentage of the doctors of Canada are members?" Imagine the strong position we would be in if we could reply, "The Canadian Medical Association represents all the doctors of Canada".

Would you not think that ordinary horse sense would bring home to the heart and mind of every doctor in Canada the necessity of doing his part to make such an answer possible?

T. C. ROUTLEY,
Toronto, *General Secretary,*
March 4, 1942. Canadian Medical Association.

Microfilm Service

To the Editor:

Recently there has been established in this Library with the approval of the Surgeon General of the Army a microfilm copying service and a weekly Current List of Medical Literature prepared from the cards made for future issues of the Index Catalogue. These two projects are conducted under the auspices of a recently organized group of Friends of the Army Medical Library. Sample copies of the Current List and a pamphlet describing Medicofilm Service are sent herewith.

The object of this undertaking is to place the resources of this Library at the disposal of those who are engaged in the advancement of medical research irrespective of where they live or work.

Undoubtedly there are many readers of your *Journal* who would be interested in learning of this service and it would be highly appreciated if you could assist us in making facts more widely known, through the columns of your *Journal.* As Librarian of the Army Medical Library, I have a great interest in the work the Friends of the Library are doing, and although I take no part in this officially, I have left no stone unturned to aid them in their work.

HAROLD W. JONES,
Colonel, M.C., U.S. Army,
Librarian, Army Medical Library.
Washington, D.C.,
March 14, 1942.

Special Correspondence

The London Letter

(From our own correspondent)

More planning.—Even if it is quite impossible to know what will be the economic and social structure of the post-war world, that does not deter those with ideas from meeting their fellows and making plans. It seems to be agreed that planning of child health services must be an essential part of post-war planning, so a score of interested parties, in the best sense of the term, have sent a letter to the medical press inviting members of the health services, private practitioners, dentists, teachers, nurses and students, to join organized groups for discussion of the many problems involved.

It is clear that the emphasis has already shifted from the sick child to the healthy child and that the next step is already showing itself, namely the view that health in its fullest sense involves a consideration of social, cultural and economic factors. Recently a prominent Oxford don pleaded for a "Ministry of Childhood"—and that may well come—and the pressure is growing from the medical side.

Those interested in tuberculosis are also planning, but to some extent their problems are more urgent, for as in all wars this time of stress and strain for all concerned is likely to lead to an increase in the pulmonary forms of this disease. The general public has been slowly educated to accept the idea that tuberculosis is preventable, and it wants to know now what policy is being adopted to secure that any threatened increase is being drastically dealt with on preventive lines. It is clear that the problems of infection and environment must be considered together and not separately. It is therefore argued that the public health services must take active steps to search out all sources of infection—with the help of mass radiography—and then initiate the necessary measures to secure improvement of the environmental standard of the infected individual or even removal of the sources of massive infection completely from their bad environment. This is the answer to the public demands, and it can be worked out in detail to give a great campaign for eradication of tuberculosis as a medical and social problem.

Some of these planning efforts are criticized on the grounds that important changes cannot be instituted in war time, but this is often an excuse for doing nothing. The midwives have set a good example in carrying on with their plans for improving their status, despite the war. Ever since 1903 no one is allowed to attend women in labour for gain unless her name appears on the Roll of Midwives, and the term "certified midwife" dates from that time. From 1934 the better title "State certified midwife" was introduced to assist the status of midwives, and the Midwives Institute, always working for the improvement and independence of its members, secured a badge and official recognition for the abbreviation "S.C.M." Finally—and this is the war-time effort — the worthy and hard-working Institute has been able to elevate itself to the status of a "College of Midwives", an event welcomed by the Minister of Health, who approves of the right of midwives to govern their own affairs and to remain an independent branch of the nursing profession.

London's health in 1940.—The health statistics for the great London County Council for 1940 and other comments on the health services provided make interesting reading in the report recently issued by the medical officer of health. For probably not even the great plague and the great fire of London in the seventeenth century presented such a deadly peril and threatened disruption as did the aerial bombardment of the last four months of 1940. Already statistics are likely to have even less value than usual in painting the picture of London's health in the circumstances, but such as exist certainly confirm the general impression that not only did London "take it" in a structural and social sense but that health did not suffer. The birth rate, infantile mortality and neonatal mortality remained essentially the same as in 1939. There was a decided fall in the incidence of scarlet fever and diphtheria, and an increase in cerebrospinal fever and measles, whilst the figures for tuberculosis were very similar to those of the previous year. The school children who remained were, of course, only a proportion of the total child population, but as far as comparisons could be made, it may be stated that among those still in London in 1940, the standard of nutrition was just as good as in 1939, dental conditions were not quite so good, those with normal vision had increased and the percentage of those said to have enlarged tonsils and adenoids had dropped from 9.2 to 3.5. So London in its sternest crisis yet maintained its records for health at a good level, which speaks for the strength and efficiency of its health organizations.

Canada's Gift.—The generous response of the Canadian Red Cross Society to Scotland's appeal for an orthopædic unit has been welcomed with as much quiet enthusiasm by the profession as a whole as was more obviously shown by those privileged to greet the unit on its arrival. Developments in orthopædics have been rapid in recent years and if Scotland has been unusually behind it has been mainly for lack of trained personnel. So the nine surgeons and twenty-two nurses who have come to Scotland have a responsibility not only for the immediate care of the hospital patients whom they will treat, but for training Scottish personnel to carry on their good work in the years to come. As an example of international co-operation nothing could be finer.

The R.C.S.—And finally for another appeal, for the Royal College of Surgeons, recovering swiftly from the destruction wrought by bombs

from above, is planning to build up again its great collection of pathological specimens. Prospective donors of specimens are asked to keep these at present but a note to the Assistant Conservator, R.C.S., Lincoln's Inn Fields, London, will register the gift and bring advice about preservation if required.

ALAN MONCRIEFF

London, February, 1942.

Abstracts from Current Literature

Medicine

Resistance of Influenza Virus to Drying and Its Demonstration on Dust. Edward, D. G. F.: *The Lancet*, 1941, **2**: 664.

Attention has recently been drawn by British workers to the part played by dust in the spread of disease, particularly infections due to *Streptococcus pyogenes* and *Corynebacterium diphtheriæ*. Both these organisms are known to survive drying and to be recoverable from dust and bed-clothes.

The present author decided to investigate the possibility that dust might be a factor in the spread of influenza and to determine the resistance of the virus to drying.

A strip of blanket was impregnated with a suspension of influenza "A" virus using a scent spray. The blanket was then dried under natural atmospheric conditions and shaken in a tank. With the Wells centrifuge virus was recovered from the air inside the tank. It was also shown that the presence of virus could be demonstrated on dust placed 8 cm. from a cage containing a ferret infected with influenza, but not on dust further away and out of reach of direct droplet projectiles. By soaking samples of serge, sheet, dust and glass slides with virus suspension, 1 per cent of virus was shown to survive drying on sheet, 1 to 10 per cent on serge and dust and 10 per cent or more on glass. On glass, 10 per cent of dried virus remained alive in the dark after 3 days, 1 per cent after 1 week and 0.01 per cent after 3 weeks; on sheet, serge and dust there was little loss after 3 days, 10 per cent remained after 7 days and 1 per cent after 2 weeks. Survival was much shorter in the light and at 37° C. Deposited as droplet nuclei on sheet, 10 per cent of virus survived for 1 week and 1 per cent for 3 weeks; on glass it disappeared in less than 24 hours.

It is believed that dried virus may be concerned in the spread of small pox, psittacosis and foot-and-mouth disease, and dust-borne organisms are now accepted as contributing to the spread of diphtheria and streptococcal infections. The evidence presented suggests the need for further epidemiological investigation into the possible rôle of dust in the spread of influenza.

The Demonstration of Tubercle Bacilli in Sputum, with Special Reference to the Flotation Technique. Proctor, R. L. G.: *J. Roy. Nav. Med. Serv.*, 1941, **27**: 149.

Flotation methods have long been used for extracting tubercle bacilli from fæces, ligroin being the fluid usually employed, and more recently methods depending on the same principle have been advocated for sputum. This author's procedure is to mix sputum with an equal volume of 0.5 per cent NaOH, shake for five minutes, maintain at 55° C. for 30 minutes, remove any solid deposit, dilute with water until no longer viscid, add about 1 cm. of xylol and again shake for five minutes. These operations are conducted in a 250 cm. measuring flask, and water is again added until the contents rise to within the neck; the xylol here separates into a creamy layer, and can readily be pipetted off. Alcohol or acetone is added to it, and the mixture centrifuged, a single small film being prepared from the deposit by allowing successive drops to evaporate on the same spot on a warmed slide.

The new features of this method are the use of a narrow-necked flask to concentrate the supernatant fluid in a small surface area, and the further concentration of this fluid by alcohol treatment and centrifugation. The concentration of bacilli obtained was from four to over ten times greater than that given by another xylol flotation technique, of which the method here described is a modification. In a consecutive series of 100 sputa, 29 in which no bacilli were found in direct films were proved to contain them by the author's flotation method, whereas the earlier method was successful in only 18 of these 29; in no case did the earlier method succeed when the modified failed. Pus and pleural fluids can be similarly treated.

Surgery

Total Gastrectomy: Indications for Operation. Morton, C. B.: *Arch. Surg.*, 1942, **44**: 72.

Morton lists the indications for total gastrectomy as: first, disease of the stomach endangering life; second, such extensive disease of the stomach that nothing short of total gastrectomy will serve to eradicate the disease and third, confinement of the disease to the stomach alone. The practicability of the operation is determined by the mobility of the stomach and of the œsophagus and by the general condition of the patient. A malignant neoplasm is ordinarily the only disease which necessitates total gastrectomy. Total gastrectomy, although theoretically an ideal practice, has one distinct drawback in that the loss of the entire stomach means the loss of the so-called intrinsic factor contained

in gastric secretion and related to the maintenance of a normal number of red cells in the circulation. Anæmia of the primary type has developed in some patients following total gastrectomy. The author describes his technique for total gastrectomy and reports the histories of four patients subjected to this operation. The author is of the opinion that total gastrectomy should be performed only on patients with moderate tumourous invasion of the stomach and with a fair prospect of complete eradication of the tumour. G. E. LEARMONTH

Mesenteric Cyst: Report of Case. Schunke, G. B. and Waugh, J. M.: *Proc. Staff Meet. Mayo Clinic,* 1941, **16**: 676.

Les kystes du mésentère ne sont pas courants. On ne relatait environ 500 en 1932. Leurs symptômes ne sont pas toujours apparents. Lorsqu'ils existent ils se révèlent d'une manière vague par une douleur abdominale constante, une tumeur visible ou palpable, ou par des signes d'obstruction. Le traitement consiste dans l'énucléation du kyste, l'extirpation avec résection de l'intestin ou la marsupialisation.

Après Lahey et Eckerson, les auteurs classent le kyste du mésentère dans le même groupe que le kyste épiploîque et retropéritonéal. Ils divisent ces kystes en six classes: le kyste wolffien, le kyste lymphatique ou chyleux, le kyste dermoîde, le kyste mésocolique, le kyste parasitaire et inflammatoire, le kyste traumatique produisant des hémorragies. Le cas cité est celui d'une emme de 51 ans, se plaignant de légères douleurs au côté droit et dont l'examen objectif et radiographique n'a dénoté qu'une petite tumeur pervienne. Elle subit une hystérectomie totale et salpingo-ovariectomie bilatérale pour son kyste du pelvis et les petits fibrômes utérins qui l'accompagnaient. A l'exploration de la vésicule biliaire, on découvrit un kyste du mésentère de la grosseur d'un poing fermé. Il fut excisé sans hémorragie. Les suites furent normales. PIERRE SMITH

L'emploi de catgut rubané dans les hystéropexies. Chanis, D.: *Surg., Gyn. & Obst.,* 1941, **73**: 877.

Les déviations utérines sont fréquentes et le chirurgien est souvent embarrassé pour choisir le meilleur des nombreux procédés opératoires déjà connus. Il faut faire de chaque cas un cas d'espèce et considérer les complications associées, en vue du meilleur traitement. Dans les rétroversions, avec annexes saines où la gravidité peut encore se produire, la fixation utérine par rapprochement rétro-utérin des ligaments ronds a été souvent employée avec de bons résultats. A la suite des travaux expérimentaux de Lowsley et d'interventions diverses sur l'homme, l'auteur a utilisé le catgut chromé en ruban pour les hystéropexies au lieu de catgut chromé ordinaire ou filiforme ou de tout autre matériel de suture. La technique est précisée par l'auteur et illustrée. Les résultats lointains restent à être observés, surtout chez les femmes qui auront des grossesses éventuelles. PIERRE SMITH

Ferrule Caps for the Head of the Radius. Speed, K.: *Surg., Gyn. & Obst.,* 1941, **73**: 845.

Speed presents his experience with a series of vitallium caps to replace the head and neck of the radius in adults. He attempts to do an intra-articular resection, removing all bone and soft tissue without injuring the synovial membrane. The resection is transverse, as far as possible, without leaving any periosteum in the joint. The ferrule-like cap with medullary peg is placed at the time of resection or at a later operation if function is limited. He points out there is less tissue reaction in the human than in the dog, upon which he has done his experiments. Three human cases are reported. All these were done in 1940. FRANK DORRANCE

Obstetrics and Gynæcology

The Results of 500 Cases of Wertheim's Operation for Carcinoma of the Cervix. Bonney, V.: *J. Obst. & Gyn. of the Brit. Emp.,* 1941, **48**: 421.

Thirty-four years of experience doing five hundred cases of Wertheim operation is clearly reviewed and the results compared with that of radium treatment. The author is very fair in his remarks. He states:—

"My 5-year relative cure-rate has varied little with the years. Without deducting patients lost sight of and dying of other disease its lowest figure has been just under 39 per cent and its highest just over 40 per cent; while deducting these cases it has fluctuated between 41 per cent and 43 per cent. Seeing that my operative technique has remained practically unaltered and my selection of cases has never varied, there is no reason why the results should substantially change except for the lessened operative mortality. Since, however, this affects chiefly the patients with advanced growth the effect is small, for the gain is offset by an increased number of recurrences. In short, the results of the operation in my hands remain fixed.

"The results of radiation, on the other hand, have steadily improved, and at the present time the best of them appear equal to the best results of the surgeon reckoned in the way described in the last section, and they may improve still further.

"Treatment by radiation has three main advantages over surgery: firstly, the immediate mortality is very small: secondly, it does not incapacitate the patient for nearly so long as an operation: and thirdly, it does not necessarily render her unfit for sexual relations. Further there are certain cases which radium may cure but surgery cannot, namely, those in

which the growth, elsewhere removable, has got a firm hold on the bladder over a limited area.

"Treatment by operation has three advantages over radium. Firstly, it is much easier to conceal from the patient the nature of the disease from which she is suffering: a great mercy; secondly, because the surgeon has at the operation shot all his bolts, and recurrence, if it comes, is incurable, subsequent visits to him are unnecessary, and indeed undesirable as tending to awake suspicion: and thirdly, that it cures a proportion of those patients in whom, by the time they present themselves, the regional glands are already carcinomatous, which radiation cannot do." P. J. KEARNS

Roentgen Pelvimetric Analysis of Walcher's Position. Brill, H. M. and Danelius, G.: *Am. J. Obst. & Gyn.*, 1941, **2**: 821.

As compared to the comfortable dorsal position, Walcher's position does not increase the length of the obstetric conjugate in a normal profiled pelvis. As compared to the comfortable dorsal position, the exaggerated lithotomy position decreases the length of the obstetric conjugate in a normal profiled pelvis.

The shortening of the obstetric conjugate in the exaggerated lithotomy position led Walcher to the erroneous conclusion that the conjugate is lengthened in the position he advocated.

In difficult breech extraction, in a normal profiled sacrum, it is deemed advisable to change from lithotomy to Walcher's position for delivery of the shoulders and aftercoming head, because the artificially shortened conjugate will thus recover its loss.

In flat sacrum pelvis with an anterior sacral prominence, Walcher's position is contraindicated, while lithotomy position will give additional space at the inlet.

The two factors of increased muscular tension and altered angle of inclination may explain the reputed clinical efficiency of Walcher's position. Theoretically, a device such as a low abdominal pressure-band and an elevation of the lumbar spine to a moderate lordosis may produce the advantages claimed by Walcher in a manner far less distressing to the patient. ROSS MITCHELL

The Rôle of Iso-immunization in the Pathogenesis of Erythroblastosis Fetalis. Levine, P., Burnham, J. L., Katzin, E. M. and Vogel, P.: *Am. J. Obst. & Gyn.*, 1941, **42**: 925.

In 93 per cent of the cases investigated, erythroblastosis fetalis results from the iso-immunization of the Rh—mother by the Rh factor in the red blood cells of the fœtus. In the remaining cases, blood factors other than Rh are responsible for the iso-immunization.

Agglutination tests for the Rh factor are of value as a laboratory aid in the diagnosis of erythroblastosis fetalis. The pathological manifestations of this disease are produced by the intrauterine action of maternal immune agglutinins on the suspectible red blood cells of the fœtus.

It is probable that iso-immunization is also the cause of a certain proportion of habitual abortions and stillbirths. Intra-group transfusion accidents associated with pregnancy can now be prevented by the use of Rh-donors and by means of modified cross-matching tests.

ROSS MITCHELL

Pædiatrics

Sulfathiazole Ointment in the Treatment of Impetigo. Steigman, J. A.: *Brit. M. J.*, 1942, **1**: 12.

The purpose of this report is to call attention to an improved method of dealing with impetigo which materially reduces the length of treatment. To clarify the etiology of impetigo the author found in 25 cases a pure culture of hæmolytic streptococcus in 12 cases, *Staph. aureus* in 8 and a combination of these organisms in the remaining 5 cases. These findings led to the adoption of the present treatment with 5 per cent sulfathiazole powder in a paraffin base. Sulfathiazole is an effective agent against both staphylococcus and hæmolytic streptococcus.

A comparative study was made on 20 patients with generalized impetigo, most of which were scabious, using the following treatment. All crusts were softened and removed by applying tincture of soft soap (B.P.C.) locally or a generalized tub bath. For the purpose of adequate comparison one-half of the body was treated three times daily with 5 per cent sulfathiazole ointment, the other with ammoniated mercury. The impetigo treated with sulfathiazole ointment showed improvement in 48 hours and was healed by the fourth or fifth day, whereas that treated with ammoniated mercury required an average of eight days.

In addition, 31 patients were treated using 5 per cent sulfathiazole ointment with similar rapid improvement. Involvement of the scalp prolonged treatment. The care of the scabious patient was facilitated by treating the impetigo first. The author concludes that local therapy with sulfathiazole ointment is the ideal treatment. K. L. MCALPINE

Oto-Rhino-Laryngology

The Repair of Recurrent Nerve Paralysis. Omerod, F. C.: *J. Laryngol. & Otol.*, 1941, **56**: 151.

Bilateral paralysis of the recurrent laryngeal nerve almost always produces marked dyspnœa and often necessitates a tracheotomy. Therefore numerous attempts have been made to repair the deformity. The only really successful methods have involved anastomosis of one of the

cranial or cervical nerves with the distal portion of the recurrent nerve. The author's operation, performed on one case successfully, is as follows. After preliminary tracheotomy the phrenic nerve was anastomosed with the distal portion of the recurrent nerve. The sternal head of the sternocleidomastoid was divided and the distal portion of the recurrent nerve found between the larynx and the carotid sheath. Then the phrenic nerve was exposed and mobilized from the omohyoid to the subclavian vein. The phrenic nerve was then split longitudinally and the fibres arising from the third and fourth cervical nerves divided. The fibres of the fifth cervical root were left intact. The cut portion of the phrenic nerve was then threaded behind the carotid sheath and an end to side anastomosis with the distal portion of the recurrent laryngeal nerve made. The results after closure were good and when seen twenty-two months post-operatively the patient had movement of her right vocal cord, both abduction and adduction, and normal respiration, but there was paralysis of the right diaphragm. GUY H. FISK

Pentothal Sodium Anæsthesia in Per-oral Endoscopy. Young, G. and Pinkerton, H. H.: *J. Laryngol. & Otol.*, 1941, **56**: 337.

Inhalation anæsthesia in per-oral endoscopy presents difficulties owing to the necessity for the surgeon and the anæsthetist to compete for the same passage way with resulting unsatisfactory control of the anæsthetic. Local anæsthesia, while useful, is not very comfortable for the patient and it is very time-consuming. Pentothal sodium in combination with some local anæsthetic works very satisfactorily. First simple spraying of the throat with 10 per cent cocaine and then painting the throat with 15 per cent cocaine with adrenaline is performed. Next a loaded cotton wool carrier with cocaine 15 per cent in mucilage is applied to the carina. Next 3 to 5 c.c. of pentothal sodium is injected into the antecubital vein in 15 seconds. After a pause of 20 seconds during which the patient is asked to count; after he has ceased counting then a further 2 to 5 c.c. is injected. Then the endoscope may be safely passed. If there is any straining during the passage of the tube a further 2 c.c. of pentothal sodium may be injected. During the examination careful watch for cyanosis must be kept. After withdrawal of the endoscope there is sometimes laryngeal or brachial spasm and this should be watched, although it usually passes off in a moment or two spontaneously. These two complications are very rare but have been reported. Preliminary medication was given in all cases. This consisted of omnopon gr. 1/3 and atropine grains 1/100. In all 150 cases have been anæsthetized this way with satisfactory results. GUY H. FISK

Radiology and Physiotherapy

Malignant Disease of the Rectum and Rectosigmoid Treated with Radium. Bowing, H. H. and Fricke, R. E.: *Radiol.*, 1941, **37**: 5.

In this short article the authors are considering chiefly the technique of treatment with radium. As a rule, results have been satisfying when the advanced type of lesion treated is considered. The radiologist will always have a large field in palliative treatment in extensive cases, though, as mentioned before, the greatest promise for the future lies in pre-operative and planned post-operative treatment of favourable lesions. In 1934. The authors published a review (1) of the data concerning 500 patients treated with radium at the Mayo Clinic from 1915 to 1931, inclusive. Of this group, 193 (39 per cent) survived for three years, five years, or ten or more years. The percentage increased to 45 for the smaller group of patients who received pre-operative treatment.

The early diagnosis and treatment of polyps of the rectum should reduce the incidence of carcinoma of the rectum. Few malignant processes of the body are as difficult and tedious to treat as rectal carcinoma. The radiologist must have considerable experience in proctology. The field of treatment is limited; only palpable or visible lesions as seen through the proctoscope can be treated. It is often impossible to outline the lesion accurately or to treat beyond the flexure of the bowel, and the actual treatment is tedious for both physician and patient. The results of treatment, however, compensate for all these factors. Treatment of lesions in few sites is so successful in ameliorating such severe symptoms as attend this condition. The results vary directly with the amount of care and painstaking effort employed by the radiologist. R. C. BURR

Irradiation in the Treatment of Cancer of the Breast. O'Brien, F. W. and McDonald, E.: *New Eng. J. Med.*, 1942: **226**: 17.

Irradiation therapy is of great benefit in supplementing surgery in the treatment of carcinoma of the breast. Definite prolongation of life occurs even in cases that are inoperable, either because of the general condition of the patient or the extent of the malignant process.

Pre-operative irradiation would seem to be beneficial, although this is hard to prove statistically. Optimum tumour damage is obtained by irradiation over a period of four to five weeks and should be followed by surgery after a further period of two to three weeks, as regrowth of the malignant process may occur after four weeks following cessation of irradiation. Post-operative irradiation should not be limited to the affected chest wall, axilla and supraclavicular chain of lymphatics, but must include the mediastinum, parasternal nodes and

lymphatics of the opposite breast and must be given over a protracted period.

Before operation is performed for breast carcinoma, regardless of how small the tumour is, the chest, spine and pelvis should be x-rayed. When this is done many clinically localized tumours will prove to be diffuse and inoperable.

In cases with distant metastases these may be controlled for long periods by appropriate irradiation. If bone metastases are suspected, because of the occurrence of pain, prompt irradiation should be carried out, even if roentgenograms of the suspected bones are normal. The entire vertebral column may be riddled without roentgenographic evidence. Occasionally, generalized skeletal metastases have disappeared completely following irradiation of the ovaries. NORMAN S. SKINNER

Anæsthesia

Post-operative Infections of the Respiratory Tract in Relation to Inhalation and Spinal Anæsthesia. (A Study of Six Hundred and Thirty-one Cases). Lyford, J.: *Arch. Surg.*, 1942, **44**: 35.

The purpose of this study was to determine the relative incidence of infections of the respiratory tract after inhalation anæsthesia and after spinal anæsthesia in patients who had not had pre-operative infections of the respiratory tract and who had undergone the same types of abdominal operations. This series consisted of 631 cases in which relatively the same number of appendectomies, inguinal herniorrhaphies and cholecystectomies were performed under ether, cyclopropane and spinal anæsthesia respectively. No previous infection of the respiratory tract existed so far as could be determined from the patient's record. Post-operative infections of the respiratory tract were classified as (*a*) pneumonia and (*b*) non-pneumonic acute infections of the respiratory tract, *e.g.*, acute bronchitis or coryza.

As found in this series the incidence of post-operative respiratory infection after the various anæsthetic agents was: after ether 5.8 per cent, after cyclopropane 4.9 per cent and after spinal anæsthesia 7.5 per cent. That is, approximately the same proportion of patients had post-operative infections of the respiratory tract irrespective of the type of anæsthesia used. Although these figures are probably small enough to make it not too markedly significant it should be observed that the incidence after spinal anæsthesia was 35 per cent greater than after cyclopropane anæsthesia and 23 per cent greater than after ether anæsthesia. These same relative proportion between the types of anæsthesia held in each operative-anæsthetic group, *i.e.*, appendectomies, inguinal herniorrhaphies and cholecystectomies. There were no deaths in this series of cases.

Factors not influencing the incidence of post-operative infections of the respiratory tract were as follows. Age did not appear to be significant, as the complications were fairly well distributed between the various decades of life among these patients. Duration of the operative-anæsthetic time did not markedly affect the incidence of post-operative pulmonary complications as this time varied from relatively short appendectomies to quite long cholecystectomies. Sex was not significant although in this series the incidence was slightly higher in females. Pre-operative complications such as cardiovascular or kidney disease, diabetes mellitus, peritonitis or cachexia did not appear to contribute to the incidence of post-operative respiratory tract complications. The kind of spinal anæsthetic agent and the pre-operative medication also were not factors in influencing the incidence of the post-operative infections nor were blood pressure changes occurring during the course of the anæsthesia.

From the data available no explanation can be given as to the anatomico-physiological course of post-operative infections of the respiratory tract. Probably, however, it is related to pain in the abdominal wound as a factor in preventing sufficient aeration of the lungs and the expectoration of mucus from the trachea.

F. ARTHUR H. WILKINSON

Therapeutics

Therapy of Tetanus. Spaeth, R.: *Arch. Int. Med.*, 1941, **68**: 1133.

The author describes a new routine of treatment introduced in July, 1923, and compares the results from the cases treated since then with the results from a group treated before that time. Cases are described as mild, moderately severe and severe, with cyanosis accompanying the convulsions. Causes of death in convulsions—asphyxiation and aspiration pneumonia. Darkened, quiet environment formed part of a treatment in which active sedative therapy was the keystone—sodium amytal and avertin being the drugs mostly used, usually over a period of 2 to 3 weeks moderate narcosis being desired, allowing the cough reflex to clear the air passages. Actual obstruction was taken care of by the usual means. The drugs were used freely, but an accurate record of the amount used was kept as milligrams per body weight—beginning with a fairly large dose which might be increased if severe convulsions were present. Method of administration—retention enemata. In emergencies the intravenous route was used. And very large amounts might be used in fatal cases. As regards the administration of serum the intrathecal route was discarded for the intravenous and intramuscular with some preference for the latter, since fewer reactions follow than when the serum is given by vein.

Local surgical treatment was discouraged unless complete destruction of tissue made it advisable. The general management is described with special efforts towards the prevention of pneumonia: frequent moving of patient to prevent resting too long on the back. If pneumonia is present the usual treatment is given, including chemotherapy and serotherapy.

There seems no doubt that the cases treated under the new routine did considerably better and that this is probably due to the sedative treatment.

P. M. MACDONNELL

Chemotherapy of Pneumonias and Immunity Reactions. Bullowa, J. G., Shackman, N. H. and Stats, D.: *Ann. Int. Med.*, 1942, **16**: 57.

The authors report the responses of the body to invasion by the pneumococcus, and it is shown that there are immunity responses which contribute to recovery when sulfonamides are used. If treated very early in the disease, the pneumococci are attenuated or killed by these drugs. Immunity is established at the usual time as if the patient had had a mild infection and had recovered spontaneously. Although in most young patients other than infants, treated early, chemotherapy is sufficient completely to suppress the disease agent or to render it relatively innocuous, there are patients, those most severely stricken, who may require assistance; to them, antibodies must be supplied to augment the immunity response. However, when pneumococci resist chemotherapy because they are fast, they may respond to type specific serum therapy, and on this account specific typing and immunity study of blood and sputum are necessary for the best care of patients. When non-specific (for type) chemotherapy is employed, patients who develop specific antibodies, require neither serum therapy nor additional chemotherapy. For such patients tapering off the drug is unnecessary and may be harmful. In addition to specific immunity, the diagnostic importance of the presence of acute phase or "C" protein is discussed.

S. R. TOWNSEND

Hygiene and Public Health

The Incidence of Trichinosis in Humans in Toronto. Kuitunen-Ekbaum, E.: *Canad. Pub. Health J.*, 1941, **32**: 569.

The diaphragms of 420 cadavers were examined by direct microscopic examination and by the digestion method in conformity with the specifications set out in U.S. Public Health Bulletin 1929. Three hundred diaphragms were from adults ranging from 15 to 89 years; 120 were from children under 16 years of age. Seven of these 420 diaphragms were found to be infected; 6 were from individuals between 47 and 62 years of age, the 7th was from a 7-months old fetus.

The incidence is considerably less than that found in other surveys which runs as high as 20 per cent. The finding of living larvæ in the 7-months old fetus seems to establish the fact that infestation is possible through the placenta. This possibility has been denied by some authors. It is interesting to note that, of the 6 adult cases, 3 showed living larvæ. No case had been recognized clinically.

According to the present survey the incidence of trichinosis in Toronto would appear to be low. The number of cadavers examined is possibly too small to draw conclusions.

FRANK G. PEDLEY

Health Status of Adults in the Productive Ages. Hailman, D. H.: *Pub. Health Rep.*, 1941, **56**: 2071.

This article contains much data derived from the National Health Survey conducted in the United States in 1935-1936 pertaining to the various ills affecting the adult population of the country. Certain comparisons are made with Love and Davenport's study of the defects of army men drafted during the World War (1917-1918).

The National Health Survey estimated that 7.7 per cent of men between the ages of 20 and 34 in the United States were suffering from major chronic diseases, such as rheumatism, heart disease, orthopædic defects, deafness, blindness, mental disease, tuberculosis, etc. Of these 0.47 per cent were disabled for 12 months or more, 1.6 per cent from 3 weeks to 12 months and 5.6 per cent were not disabled. In addition to the 7.7 per cent suffering from major chronic diseases, 4.7 per cent of men in this age group had minor chronic disease, such as hay fever, hernia, varicose veins, bronchitis, sinusitis, etc., some of which would disqualify for the army.

If these percentages are translated into actual numbers it would mean that 1,246,000 young men would certainly be ineligible for the army and a proportion of 760,000 with minor chronic defects would also be ineligible. The proportion of men actually rejected for military service is higher than would be expected from these figures. The reason for this is: "Many of the defects noted are obviously noteworthy only from a military standpoint. . . . A large proportion of the mechanical defects . . . are no serious handicap in civil life. Also, many of the defects of sense organs found are easily capable of correction so as to fit a man to perform his duties in civil life."

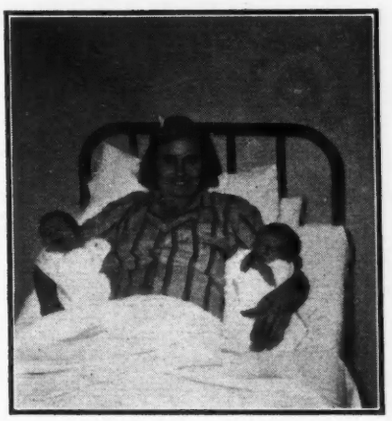
Comparable figures are also given for men in the age group 35 to 64 and for women in the age groups 20 to 34 and 35 to 64.

FRANK G. PEDLEY

Miscellany

Unusually Large Twins

Mrs. D., who had had 9 full term children, was admitted to Loon Lake Hospital about a half hour after labour pains commenced January 22, 1942. Within an hour after ad-



mission uni-ovular twins were born and the placenta was delivered. Both were vertex presentations. The first twin weighed 11 lbs. 13 ounces, the second, born ten minutes later, weighed 9 lbs. 13 ounces.

J. D. GRANDY.

Loon Lake, Sask.,
February 9, 1942.

Rose Hips for Oranges

Nine British factories turn 200 tons of them into syrup.

Two hundred tons of rose hips gathered from the hedges of England and Scotland last autumn have been turned into syrup for the older children in Britain who cannot get a regular supply of oranges.

Like the orange, rose hips are a rich source of vitamin "C", the anti-scurvy vitamin.

Before the war it never occurred to anybody to use rose hips, but when the supply of oranges dwindled a small army of Boy Scouts, Girl Guides, teachers and Women's Institute members turned out into the lanes with their baskets.

Even housewives who were expert jam makers found it difficult to keep the hip hairs out of the syrup and the hips were therefore sent off to nine factories which have now produced from them 600,000 bottles of syrup. Young children are sipping it with relish at the rate of one teaspoonful a day. Two teaspoonsful in the twenty-four hours give all the vitamin C which older boys and girls require.

Britain's Ministry of Health are so pleased with the result that they are hoping for a much bigger collection of rose hips when autumn comes round again.

University Notes

University of Western Ontario

The Department of Surgery of the University of Western Ontario is continuing with the eighth annual post-graduate course this year. It will cover Traumatic Surgery and War Medicine. The meetings are held on five successive Wednesday mornings beginning at 10 o'clock on April 8th and continuing until May 6th. Clinics are presented in Victoria Hospital. All members of the profession are cordially invited.

Obituaries

Dr. James Brodie Ross, secretary of the medical board of the Montreal General Hospital, and assistant professor of medicine at McGill University, died on March 7, 1942, in his 41st year. He had been in ill health since last September. He resided at Sunnyside Avenue, Westmount.

Born at Georgetown, British Guiana, the son of Rev. George E. Ross and Mrs. Ross, of Granby, Quebec, James Ross had his early education at Charlottetown, P.E.I., Goderich, Ont., and Montreal High School, completing his studies at McGill University, where he graduated in medicine in 1924. During his university course he was active in various sports, and was captain of the McGill swimming team.

Dr. Ross graduated with honours and went as House officer in the Montreal General Hospital and continued his post-graduate studies in pathology and in medicine. He was superintendent of the Children's Memorial Hospital for a time while senior intern in medicine at the General, and when he went into practice he was appointed assistant demonstrator in medicine. From that position he rose to be associate professor in medicine and succeeded Col. L. C. Montgomery as physician of the General Hospital when the latter went overseas. Dr. Ross was particularly interested in tuberculosis and chest diseases, and made a special study of the latter.

"No man in Montreal had a brighter future in medicine than he had," said Dr. A. H. Gordon, former physician to the General Hospital. "He was extremely popular with his confrères and greatly esteemed by his patients. He had a large consulting practice and was regarded as one of the top-flight diagnosticians on chest diseases in the city."

He was a member of the Canadian Medical Association, the American Clinical and Climatological Association, of the Royal College of Physicians and Surgeons of Canada, the Montreal Medico-Chirurgical Society, the Lafleur Reporting Society and the McGill Reporting Society.

Surviving are his wife, formerly Miss Frances Stephens, of Richelieu, and one daughter, Sandra; his parents; one sister, Mrs. Marion McMahon, Boston, Mass.; and three brothers, Dr. Alan Ross and Dr. Hugh Graham Ross, of Montreal and Sheldon Ross, of Granby, Que.

Rev. Dr. George Ross, his father, was at one time Moderator of the Montreal Presbytery, and held pastorate at St. Matthew's Presbyterian Church, Point St. Charles, and Montreal West, as well as in Ottawa and Fredericton, before he retired from the ministry to reside at Granby.

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Those who did not know Jim Ross will gather from the bare facts of his life something of the tragedy which his death represents to our medical and social community. Those who did know him need not be reminded of that. He typified the very best in modern medicine; not because he had any one quality in great excess—more probably because he did not. He had energy equalled by some, but not by many, and surpassed by none. He also had the gift, which de-

veloped steadily in degree, of orderly management of his rapidly increasing work and duties. This showed in all he did, from his beautifully neat handwriting to his lucidity of teaching. It enabled him to meet every demand on his time and these grew beyond computation. It also enabled him to take a keen and cultivated interest in a wide variety of subjects: the talk was always good where Jim was. He not only informed, but he turned a subject about and looked at it in a fresh light.

> Around the vase of life at your slow pace
> He has not crept, but turned it with his hands,
> And all its sides already understands.

It is hard to know that he has gone from among us.

H.E.M.

Dr. Frank R. England. One of Canada's outstanding surgeons who had practised in Montreal for over 40 years, and was known throughout the city, died at his residence on March 9th. He was in his 80th year, and had practised his profession up to three months ago when he was taken ill.

He was the son of Francis England and Jane Ruiter, having been born at Cowansville, Que., on August 21, 1862, of United Empire Loyalist stock. He was educated at Waterloo, Que., and the normal school in Montreal. He was an alumnus of Bishop's College, and in his younger days was well known as a practical educator. He graduated with the class of 1885, with the degrees of M.D., and C.M. and he obtained the Wood and Nelson gold medals. He was professor of diseases of children at Bishop's College in 1887 and professor of surgery in the same institution in 1894.

In 1905 he graduated from McGill College (*ad eundem*) and in 1906 he was chosen president of the Montreal Medico-Chirurgical Society. He was a governor and fellow of the American College of Surgeons. For many years Dr. England was surgeon to the Western Hospital and served of late as consulting surgeon to the Western and Women's Hospitals. He married in 1887 Carrie Ann Galer, of Dunham, Que., and following her death married Dr. Octavia Grace Ritchie, who survives him. His son Murray Galer England, of Niagara Falls, Ont., and his daughter Esther Ritchie England, also survive.

Dr. Grace Ritchie England, his widow, was one of the first class of women to graduate from McGill and the first woman to receive a medical degree in the Province of Quebec.

Dr. Malcolm Ferguson died at his home on March 2nd after a long illness. He was an active practitioner in Toronto and Huron County for half a century.

Born in Harriston, Ont., 80 years ago, he was educated in Harriston schools, model school, and graduated from Old Trinity College in 1892. Dr. Ferguson began his practice in Ethel, near Brussels, and was widely known in Huron County for 35 years before coming to Toronto.

He was an elder of Kew Beach United Church, a member of St. John's Masonic lodge and Academy of Medicine.

He is survived by his wife, formerly Charlotte Davies of Ethel, Ont.; a son, Dr. C. Ross Ferguson, Copper Cliff; and a daughter, Edith Ferguson, Toronto; one brother, Dr. John Ferguson, Mount Forest, and two sisters, Mrs. Donald Smith, Harriston, and Mrs. Malcolm McCannell, North Dakota.

Dr. Robert Dickson Ferguson, who practised at Pilot Mound for 45 years, died at his home on March 2nd, full of years and honours. Born in Melrose, Ont., in 1866, he came to Manitoba at 16 and graduated from Manitoba Medical College in 1897. During the last war he served overseas. After the war he continued to practice at Pilot Mound with the assistance during the last two years of his adopted son, Dr. W. H. F. O'Neill. Dr. Ferguson was mayor of the town for several years, medical health officer for many years, an elder of Knox United Church and patron of the Canadian Legion. Gardening was his hobby. He is survived by his widow and two foster children, Miss Norah O'Neill, Toronto, and Capt. W. H. F. O'Neill, R.A.M.C., now at Angler, Ont.

Dr. Joseph Gauvreau. One of the outstanding Montreal members of the French medical fraternity, Dr. Gauvreau, died at the Hotel Dieu on or about March 3, 1942, at the age of 71 after a short illness. He was a graduate of Laval University (1898). Dr. Gauvreau was noted as an historian. He wrote "Doctors in French Canada". He was given an award by the Medical Academy of Paris in 1933.

Dr. Gauvreau, besides, was a writer of note on tuberculosis, infantile mortality and temperance. He held many important posts, which included secretary of the Laval Military Hospital in France from 1914 to 1920, governor and secretary of the College of Physicians and Surgeons of the Province of Quebec, and posts with the Bruchesi Institute, Ecole Sociale Populaire and other outstanding French Canadian institutions.

He is survived by his widow and three sons, Jean Marie, Rev. Father Alexander, and Elzear.

Dr. Herbert Lightstone, D.S.O., M.C., a graduate of McGill University (1910), and a veteran of three wars, died recently in London, according to information sent to relatives in Montreal. Burial will take place in London.

A native of Montreal, Dr. Lightstone was born in 1878, educated at the Montreal High School, Bishop's University and finally McGill. He practised medicine in Montreal until 1910 and then went to Harley Street, London.

He served in the Spanish-American War, went through the Boer War with the Canadian Field Artillery, enlisted at the outbreak of the first Great War and then accompanied the British expedition in Russia after the war. He was mentioned in dispatches six times. He was also decorated by the French Government for work in a typhoid epidemic.

He was named Deputy Director-General of Medical Services in the British Ministry of Pensions in 1933, and in 1938 became acting director-general. He suffered recently from a stomach ailment, and died at the age of 63.

He is survived by two daughters, Mrs. Lyon Lightstone, London, and Miss Diana Lightstone, of Montreal, two sisters, Mme. Pauline Donalda, distinguished Montreal operatic star, and Miss May Lightstone; and five brothers, Harry and Robert of Montreal; Lyon, of Vancouver; Gordon, of Toronto, and Albert, of New York.

Dr. Henry Lunam, aged 84, who carried on a medical practice in Restigouche County, New Brunswick, and Bonaventure County, Quebec, for more than a half-century, died recently at Campbellton, N.B. He was forced to retire several years ago on account of failing health.

Dr. Lunam settled in Campbellton in 1881 after graduating from McGill University (1881). In 1900 he worked 24 hours a day during a smallpox epidemic, and later he was frequently called upon by the Provincial Government to investigate suspected cases of the disease. Dr. Lunam was a Life Member of the Canadian Medical Association and also of the New Brunswick Medical Association.

Dr. John Knox MacLeod, of Sydney, N.S., died on February 19, 1942, aged 79. A native of Sydney, Dr. MacLeod was a son of the late Rev. Dr. Hugh MacLeod, first Moderator of the Presbyterian Church in Canada. He was a graduate of Bellevue Hospital Medical School, New York (1883). He was appointed Sydney's medical officer in 1907 and served in that office up until his death, except for a few years during and immediately after the First Great War, in which he served in the Medical Corps. He was highly respected by all who knew him, affable, popular, and of sterling personality. He will be greatly missed.

News Items

Alberta

By a recent Order in Council by the Alberta Government, the members of the Cancer Commission have been appointed a Board of Enquiry, and are thus empowered to investigate other claims of the so-called Koch Cancer Cure as well as the claims of other remedies being sold to the public.

The Department of Health has estimated for an increased expenditure, $30,000.00 for the work of the Cancer Clinics. The work will be enlarged. During the past year 1,142 patients were examined by the two cancer clinics; of this number 50 per cent were found to have cancer. One hundred and fifty-nine cases were diagnosed as hopeless; 411 were given deep x-ray therapy with an anticipated hope of recovery in 60 per cent of them.

In 1935 154 tuberculosis clinics were held, when 1,803 persons were examined. In 1940 there were held 313 clinics, and 10,222 persons were examined. The death rate has fallen from 25 to 17 per 100,000 of the population.

Alberta has 94 approved hospitals with 4,635 beds and had in 1940, 1,179,832 patient days with a total government per capita grant of $493,500. For the year 1941 it will go well over the half million dollars.

In rural Alberta the general infantile mortality is between 40 and 60 per cent higher than that of the cities of Calgary and Edmonton, so there is a demand for more health units. It is found that with the work of the Health Units their records are about equal to the above-mentioned cities. There are already nine rural health units, half of the cost being borne by the Province as a whole.

Owing to the Canadian Medical Association Convention in June this year, at Jasper, the Alberta refresher course put on by the Alberta Division and the Staff of the University of Alberta will be held in September about the time of the regular annual conventions. As last year, so again, a questionnaire will be sent out to all registrants, in order that the course may be the best suited to the needs and the desires of the profession. These courses are being more and more appreciated by those who attend.

In order to facilitate obtaining of the books, the office of the Registrar got a sufficient number of application blanks, had them properly signed and sent to the physicians throughout the Province, thus avoiding delay. Whether category "C" will allow physicians to get sufficient quantity of gas for their work remains to be seen. It is anticipated that the Oil Controller will permit a further supply to meet the exigencies of special cases when so advised.

Strong protests have been made against the fee set by the Provincial Government Insurance Board for medical examinations and the hope is that those who agreed to take the smaller fee will realize their mistake and help get the matter properly adjusted.

Dr. E. P. Scarlett, of Calgary, was the guest speaker when he gave an address to the graduating class of the Faculty of Medicine, Alberta University, at the Convocation which was held at Edmonton on March 7, 1942. G. E. LEARMONTH

Manitoba

The Manitoba Medical Association has appointed the following committee to organize the Manitoba Medical Service: Drs. M. R. MacCharles, Chairman, H. F. Cameron, Secretary, J. Stewart McInnes, A. Clifford Abbott, Claude McRae and Brian D. Best. It is proposed to ask of the next session of the Manitoba Legislature an enabling act setting up a non-profit Manitoba Medical Service.

This scheme has grown out of the experience of Winnipeg physicians with the Firefighter's Club of Winnipeg prepayment plan which has been in operation nearly two years. The proposal is to extend this plan to other employed groups in Greater Winnipeg. Two plans will be offered: one providing members and their dependents with a complete medical and surgical service including office calls, home calls, care in hospitals, refractions, radiology, with provision for the use of specialists at the following monthly charges: $1.50 a month for husband or single employee; $1.30 a month for wife or adult dependent; $0.80 a month for each unemployed dependent under 19 years; and an alternative plan providing surgical service in hospitals only. This is defined as operative and cutting procedures for the treatment of diseases and injuries; treatment of fractures and dislocations, maternity services in the hospital after one year's continuous membership. The proposed charges are: $0.50 a month for husband or single employee; $1.25 a month for employee and wife; $2.00 a month for employee, wife and unemployed children under 19 years.

A Service Contract covering one or other of these plans will be offered to those with an income of $2,500.00 a year or less. A contract of indemnity will be offered those with an income over this salary limitation.

All the qualified medical practitioners in Greater Winnipeg have been requested to state whether they will enter the service following a meeting of the profession which approved of the plan for complete medical service and in principle for the plan of surgical benefits. Doctors will be paid on a fee basis, and a schedule of fees is being prepared.

The Surgical Benefit Plan is being adapted after that in operation in several states in the U.S.A. during the past several years. The subscribers' fees proposed are those of the Michigan State Service. Experience in the United States suggests that the plan chiefly favoured is the Surgical Benefit Plan which gives protection against catastrophic illness.

The administration of the Manitoba Medical Service will be undertaken by the Manitoba Hospital Service Association. This has been in operation for three years and is well and favourably known to the public as a non-profit co-operative organization. It has established a reputation for fair dealing and economy in operation.

No. 3 Casualty Clearing Station, R.C.A.M.C., has received an order to mobilize for active service. It is stated that Major G. S. Williams, formerly Superintendent of the Children's Hospital, Winnipeg, who is now in England will be the commanding officer with the rank of Lieutenant-Colonel. Other officers of the unit will be Major Jack McKenty and Major Cyril Stevens.

At the annual meeting of the Sanatorium Board of Manitoba on February 7th, Mr. John McEachern was re-elected Chairman. Dr. E. L. Ross, Medical Superintendent of the Board, reported a record low tuberculosis death rate during 1941. It was approximately 40 per 100,000 population as compared to a rate of 50 per 100,000 in 1940.

Winnipeg was favoured in having the first lectures of the Royal College of Physicians and Surgeons of Canada given *in extenso*. On the evening of February 27th they were delivered in the University of Manitoba before an appreciative audience including members of the Association of Clinical Surgeons of Western Canada, then in session. Dr. P. H. T. Thorlakson was chairman of the meeting.

Dr. A. T. Mathers, President of the Royal College discussed "Psychoneurosis in war time". He advocated painstaking and complete examination as so often the patient complained of symptoms pointing to organic disease. The patient and his relatives usually considered organic disease to be more respectable than a psychical disturbance. He suggested that

attention should be paid in examining recruits to their psychological state. In this way the United States had reduced the disability from this factor in their armed forces in the last war considerably below that of Canada and Great Britain. The main manifestations of psychoneurosis in war time be classified as fatigue states, hysteria and anxiety neurosis.

Col. Edward Archibald, Consulting Surgeon to the Director General of Medical Services, spoke on "Wound infection of the extremities". He paid tribute to the work of Alexis Carrel and Sir Robert Jones in the World War 1, and Trueta in the Spanish War, and emphasized the importance of wound excision within four hours, if possible, of the entrance of infection. He pointed out the difference between wounds in the last war produced by relatively large fragments of lower velocity with wounds caused by small fragments of the higher velocity of air bombs. He mentioned the results of blast concussion. The value of the sulfonamides, particularly sulfathiazole, was stressed, especially when dusted as powder in the wound. He prophesied that casualties with compound fractures of the femur might in future be transported by airplane, or that surgeons might be moved nearer to the front, so that wound excision might be done at the earliest possible moment.

Dr. John Gunn moved, and Dr. J. D. Adamson seconded a vote of thanks to the lecturers for their illuminating addresses.

In addition to Major G. S. Williams, who has been recommended to be commanding officer of No. 3 Casualty Clearing Station, Major Jack McKenty, physician, and Major C. H. Taylor, registrar, the following officers have been named: Major J. A. B. Hillsman, surgeon; Capt. D. G. Revell, anæsthetist; Capt. L. R. Rabson, surgeon; Capt. J. D. Markham, Fort William, specialist in internal medicine; Capt. H. A. Roberts, quartermaster; Lieut. N. P. Merkeley, surgeon; Capt. A. W. McCulloch, radiologist, and Capt. G. K. McKeown, Canadian Dental Corps.

Excavation work has begun in preparation for a new medical clinic in Winnipeg at the corner of Vaughan Street and St. Mary's Avenue, diagonally opposite the Civic Auditorium. It is expected that the building will be completed in July. It will be of smooth Tyndall stone and glass brick construction, comprising two storeys and a partial basement.

Plans for the building were made with extreme care that materials to be used would not in the slightest way affect essential war supplies. The use of structural steel has been eliminated entirely, and priorities officials in Ottawa have given full approval of the building plans.

It will be known as the Winnipeg Clinic. Rental paid for the building by the Winnipeg Clinic will be applied on the cost. The Winnipeg Foundation will hold the deed from the start, and its equity in the building will grow from year to year until it holds clear title.

Associated with the clinic will be the establishment of a medical research foundation to be supported by funds realized from operation of the building. The foundation in turn will finance medical research and scholarships.

Details of the medical organization are not yet ready for announcement, but the immediate organization will comprise about 15 medical men, with every anticipation that the number will be increased.

The basement will house a conference room for the medical staff, a lounge and a limited number of bed-sitting rooms for clinic patients who may desire to stay in the clinic during the day for prolonged investigation. The ground floor will house the main office, the reception hall, administration rooms, with x-ray department and laboratories. The top floor will be devoted entirely to consultation rooms.

ROSS MITCHELL

New Brunswick

Lieut.-Col. George Lyons, M.C., R.C.A.M.C., Commanding Officer, No. 14 Field Ambulance overseas has been granted the Canadian Efficiency decoration.

Dr. H. A. Farris, who has been absent from the Province undergoing surgical treatment and a short convalescence in the south, has returned home much improved in health.

The officers of the medical staff as elected for the Hotel Dieu Hospital, Moncton, for 1942 are as follows: President—Dr. J. A. Gaudet; Vice-president—Dr. V. P. Doucet; Secretary—Dr. John Stewart; Executive Committee—Drs. A. R. Landry, R. D. Roach and J. E. Leger.

Dr. L. W. Brownrigg, of St. Stephen, and Dr. Norman Cobb, of Calais, both members of the St. Croix Medical Society are at present doing post-graduate studies at Tulane University, New Orleans.

Dr. L. De V. Chipman, of Saint John, has been elected President of the New Brunswick Red Cross Society. Dr. Chipman was also re-elected President of the Saint John Council of the Boy Scout's Association.

Dr. W. W. White, of Saint John, has been elected President of the New Brunswick division of the Saint John Ambulance Association. At this, the annual meeting, it was announced that Dr. W. W. White and to Dr. G. B. Peat, of Saint John, had been promoted to the rank of Commander in the Venerable Order of the Hospital of Saint John of Jerusalem.

The monthly meeting of the Saint John Medical Society was addressed by Dr. George Skinner on, "The treatment of varicose veins". Following the clinical discussion, Dr. Skinner illustrated his subject by motion pictures. At this meeting a special committee to study medical economics was appointed. Dr. Skinner is chairman of this committee and the members are: Drs. R. J. Collins, A. L. Donovan, R. T. Hayes, N. Skinner and A. S. Kirkland. A. STANLEY KIRKLAND

Ontario

Dr. Allan Roy Dafoe, whose resignation as physician to the Dionne quintuplets was offered early in February, has been succeeded by Dr. I. Joyal, of North Bay, who has accepted the post.

The Honourable Harold J. Kirby, Minister of Health, has announced the formation of a Provincial Committee on Nutrition, to spread nutritional knowledge throughout Ontario and raise health standards. Dr. J. T. Phair will preside over the Committee. Subcommittees have been set up to review the practicability of certain proposals for creating public health interest in the problem of nutrition.

Lt.-Col. R. M. Wansbrough, after twenty-six months overseas, has been recalled from his post as a Commander of a Canadian Hospital in Britain to assume his work as surgeon at the Hospital for Sick Children, and in the Department of Surgery at the University of Toronto.

Dr. W. S. Foote has been appointed Temporary Medical Officer of Health in Paris, while Dr. A. S. Dunton has been given leave to join the R.C.A.M.C.

On Friday afternoon, February 20th, there was held in Convocation Hall in the University of Toronto a commemoration service to mark the anniversary of the death of the late Sir Frederick Banting. The service opened with the commemoration prayer by the President, Dr. H. J. Cody, followed by Mendelssohn's "Funeral March" played by the University Organist, Dr. Healey Willan. Lady Banting presented,

and the Chancellor, Sir William Mulock received, on behalf of the University, the late Sir Frederick Banting's orders, medals, and prizes received from governments and societies throughout the world for his service to humanity. The first Banting Memorial Lecture was delivered by Dr. C. J. Mackenzie, Acting President of the National Research Council of Canada.

Few, perhaps, of the profession are aware of the School of Aviation Medicine which has been in operation in Toronto, first at No. 1 Manning Depot and more recently at No. 6 Initial Training School. Every month a class of forty medical officers of the R.C.A.F. takes this course.

During the recent short Session of the Ontario Legistlature, the Minister of Health introduced a Bill to amend the Medical Act by which a physician's name may be stricken from the Ontario Register in the event of his being found to be mentally incompetent or mentally ill. It provides that, on application of four registered medical practioners, the Council of the College of Physicians and Surgeons of Ontario shall pass on the propriety of a doctor continuing practice after complaint is made as to his incompetency.

An amendment to the Public Health Act provides for a change in methods of the pasteurization of milk. At the present time, milk must be held at 140 degrees for thirty minutes. The Bill proposes 161 degrees for fifteen seconds.

The Attorney-General has announced a re-organization of the Medico-Legal Branch of his Department in a decentralized plan calculated to give crime detection work a degree of efficiency not hitherto reached in Ontario. The Department has been working on this development since the death of Dr. E. R. Frankish.

There will be pathologists in various centres throughout the Province, with a central headquarters staff of consultants in pathology and related studies. The Attorney-General also announced that he had in mind for some time the advisability of setting up Police Schools in Western, Eastern, Northwestern, and Northern Ontario, to supplement the work of the Police School as carried on in Toronto by the Toronto Police.

The personnel of the newly organized Medico-Legal Branch is as follows

Headquarters Staff.—Medical Director, Dr. Smirle Lawson, Supervising Coroner for Ontario; legal adviser, C. L. Snyder, Deputy Attorney-General; consulting psychiatrist, Dr. B. T. McGhie, Deputy Minister of Health; consulting chemist, Professor L. Joslyn Rogers, professor of analytical chemistry, University of Toronto; consulting pathologists, Dr. W. L. Robinson, professor of pathology, University of Toronto, and Dr. I. H. Erb, Chief Pathologist, Hospital for Sick Children; ballistics' expert, Sergeant J. A. Churchman, R.C.M.P.; handwriting expert, Sergeant S. H. Lett, R.C.M.P.

Associate District Pathologists.—London district, Dr. J. H. Fisher, professor of pathology, University of Western Ontario, and Dr. F. W. Luney, associate professor of pathology, University of Western Ontario; Windsor district, Dr. Stanley M. Asselstine, pathologist, Windsor hospitals; Hamilton district, Dr. W. J. Deadman, chief pathologist, Hamilton General Hospital; St. Catharines district, Dr. Lorne Whitaker, pathologist, General Hospital, St. Catharines; Kingston district, Dr. James Miller, professor of pathology, Queen's University, and Dr. W. D. Hay, assistant professor of pathology, Queen's University; Belleville district, Dr. J. B. McKay, pathologist, General Hospital, Belleville; Kitchener district, Dr. L. C. Fischer, pathologist, Kitchener and Waterloo Hospital, Kitchener; Peterborough district, Dr. C. B. Waite, Department of Health Laboratory, Peterborough; Ottawa district, Dr. Max O. Klotz, chief pathologist, Ottawa Civic Hospital; Port Arthur district, Dr. Albert E. Allin, Provincial Laboratory, Fort William; Sault Ste. Marie district, Dr. N. F. W. Graham, pathologist, Plummer Memorial Hospital, Sault Ste. Marie.

Among the funds, scholarships, bursaries, prizes and other awards for student competition or assistance, recently established at Queen's University, are the following.

The Hannah Washburn Polson Prize.—Founded by Dr. James A. Polson, Medicine '10, in memory of his mother. Annual value, $50. Awarded to the final year medical student showing the greatest proficiency in clinical diagnosis in medicine, surgery and obstetrics.

The Helen E. Dwyer Memorial Scholarship.—Established by Dr. James G. Dwyer, Arts '02, Med. '05. Annual value, $50. Awarded to the second-year medical student obtaining the highest standing in embryology and histology.

The N. C. Polson Memorial Prize.—Established by Lt.-Col. Stuart M. Polson, Arts '05, Med. '10, in memory of his father. Annual value, $50. Awarded to the final year medical student judged by his teachers to be the best adapted to apply his training in practice.

The Mylks Medal in Obstetrics and Gynæcology.—Provided by Dr. G. W. Mylks, Med. '97. Awarded to the student in final year medicine who has had the best record in obstetrics and gynæcology during the last three years of his course.

From the University of Western Ontario Alumni Gazette, we abstract the following:

Col. Leonard G. Rowntree ('05), of Philadelphia, is Medical Director of the Selective Service Board for U.S.A.

Col. Evans Davis ('06), C.M.G., of London (D.D.M.).

Lt.-Col. Paul Poisson ('09), M.C., V.D., of Tecumseh, is stationed at Wolseley Barracks.

Lt.-Col. Gordon Jepson ('10), M.C., of London, is D.M.O., London.

Lt.-Col. Cameron Wilson ('10), of London, is O.C. Trafalgar Hospital, London.

Major W. C. Morgan ('12), of Belleville, is O.C. Howe Lake Hospital, N.B.

Capt. F. H. Bowen ('13), of Windsor, is stationed at Trafalgar Hospital, London.

Capt. Sam. Bean ('14), of London, is at Wolseley Barracks.

Capt. Wm. Denney ('17), of London, is at Trafalgar Hospital, London.

Lt.-Col. Wm. Mace ('22), of London, is O.C. 15th Field Ambulance.

Capt. Roy McLeod ('23), is with 15th Field Ambulance.

Lt.-Col. A. A. James ('23), of Sarnia, is D.M.O., Saint John, N.B.

Capt. Jas. Balfour ('25), of London, is now of Trafalgar Hospital, London.

Capt. Carman Kilpatrick ('29), of Blyth, is at Wolseley Barracks.

Capt. Wm. Johnston ('31), of London, is at Trafalgar Hospital.

Capt. Walt. Middleton ('31), of London, is with No. 15 Field Ambulance, Sussex, N.B.

Sect. Leader Olive Stewart ('35), of Strathroy, is with the C.W.A.A., Toronto.

Capt. W. Needham ('40), of Chatham, is stationed at Wolseley Barracks.

Sect. Leader Mary Wimpory ('41), of Stratford, is with the C.W.A.A.F., Toronto.

The Oshawa *Times and Gazette* issued on March 5th a special souvenir edition of 16 pages devoted to the Oshawa General Hospital. The newly opened Sykes Memorial wing provides further accommodation expanding the institution from 100 beds to 176 beds. This special number gives a history of the growth and development of the hospital since its inception. It gives splendid illustrations of the buildings, equipment, its trustees, and supporters. The Children's wing is a splendid part of the hospital, with special

provision for work with crippled children. The nursing school, opened in 1910 with 4 students, has graduated over 200 nurses. The medical staff now totals 22 active with 9 on the associate list.

The medical profession in Ontario feels much indebted to the Oil Controller for a splendid co-operation which has been given in securing special categories in the gasoline rationing. The prompt way in which the supplies of applications were forwarded to the College of Physicians and Surgeons for certification has saved a good deal of time and facilitated issuing the books of coupons. J. H. ELLIOTT

Quebec

Le Dr Albert deGuise a été nommé professeur de Pathologie Médicale et le Dr J. A. Mousseau, professeur de Matière Médicale et Pharmacologie à la Faculté de Médecine de l'Université de Montréal.

La Société de Chirurgie de Montréal vient d'élire le nouvel exécutif suivant pour l'exercice 1942: *Président honoraire:* Dr Edmond Dubé; *President:* Dr Urgel Gariépy; *Vice-président:* Dr Charles Bohémier; *Secrétaire-général adjoint:* Dr Pierre Smith; *Secrétaire annuel:* Dr C. Lefrançois; *Trésorier:* Dr J. H. Rivard; *Archiviste:* Dr Charles Hébert.

L'Hôpital du Sacré-Cœur de Cartierville a élu récemment le Bureau médical suivant: *Président:* Dr J. A. Vidal; *Vice-président:* Dr Yvon Laurier; *Secrétaire:* Dr J. P. Paquette.

Le Dr Emile Nadeau qui fut directeur adjoint du service Provincial d'Hygiène et Directeur du Service de Santé de la ville de Québec a été récemment nommé président de la Commission d'Industrie laitière de la Province. JEAN SAUCIER

Saskatchewan

The following story of No. 8 General Hospital which may be overseas by the time this is published has been kindly given by the Hospital Registrar, Major J. G. K. Lindsay.

Col. H. Gordon Young, D.S.O., M.C., of Leask, Young, Burwell and Black, of Moose Jaw, was selected to enlist, organize and command No. 8 General Hospital which had been designated for some time as a unit from the Province of Saskatchewan.

Col. Young began his work early in July, 1940, and as the situation was very serious at that time, quickly brought the unit up to strength and began an intensive period of training officers and other ranks.

Major H. J. Spooner was reposted from the 10th Field Ambulance to assist in this enlisting and organizing period.

The headquarters of the unit was set up at Dundurn Military Camp, Sask., for the training period. The medical officers, chiefly from the Province of Saskatchewan, were quickly selected.

Lt.-Col. R. B. Martin, of Regina, is the officer in charge of surgery for the unit. He is a veteran of the last war when he won the M.C.

Lt.-Col. C. F. Bennett, formerly of the Saskatchewan Anti-Tuberculosis League, veteran of the R.A.F. in the last war, is officer in charge of medicine.

Major H. J. Spooner, of Regina, is specialist in surgery.

Major F. W. Schroeder, of Regina, joined the unit on transfer from the R.C.A.F. medical services, as surgeon.

Major C. F. W. Hames of the Department of Public Health, Regina, a veteran of the last war, was appointed Registrar. He had been acting as D.M.O. of M.D. No. 12, Regina, previous to this posting. He remained with the unit until March of 1941 when he recruited the 12th Field Hygiene Section and became its Officer Commanding. He rejoined No. 8 General Hospital in January, 1942, as reinforcement M.O.

Major J. M. Campbell as surgeon specialist in urology had, prior to enlistment, set up practice in urology in Saskatoon where he had for some years been associated with the University of Saskatchewan as assistant in the Department of Anatomy.

Major L. M. Fairbain, surgeon of Estevan, was added to the surgical slate.

Major J. C. Patterson formerly pathologist in the Regina General Hospital, and lately in Ottawa, became pathologist and remained with the unit until August, 1941, when he was recalled by the Department of National Defence for special work. He was replaced by Major R. A. H. MacKeen, of Saint John, N.B.

Major J. E. McCutcheon, of Leeds and McCutcheon, became the anæsthetist.

Major E. Gordon Spooner, brother of H. J. Spooner, recently returned from post-graduate work in England, joined the unit as ear, nose and throat specialist in December, 1941. The ophthalmology was taken over by Major E. Wolstein, of Ottawa, who was reposted from an Ontario unit.

Major J. B. Trudelle, of Regina, veteran of the medical services of the last war, was posted to the unit shortly after commencement of mobilization.

Major E. W. Spencer, radiologist at the Saskatoon City Hospital and Saskatchewan Cancer Commission in Saskatoon, was appointed unit radiologist.

Capt. J. Angus MacDonald well known surgeon of Prince Albert was appointed to the unit and was removed therefrom by his untimely death in November, 1940. Capt. MacDonald's loss was the first, and a very serious, casualty in the officer personnel of the unit.

Major J. G. K. Lindsay joined the unit as medical officer and became Registrar in March, 1941, when Major C. F. W. Hames took over command of the 12th Field Hygiene Section.

Capt. H. J. Anderson, formerly of the Anti-Tuberculosis League of Saskatchewan, joined the unit as medical officer in September, 1940, and remained with the unit until ill health necessitated his discontinuance in the service.

Capt. G. M. Malone, of Read and Malone of Regina, joined on its mobilization and has acted as unit M.O. since that time.

Capt. Sydney Young, of Moose Jaw, discontinued his internship in Vancouver General Hospital to join the unit in March, 1941.

Two medical internists, Capt. B. M. Fahrni and Capt. C. E. G. Gould, joined the unit at a later date from Vancouver and are on the medical slate of the unit under Lt.-Col. C. F. Bennett.

Capt. R. D. Reid, of Regina, prominent in golf circles in Saskatchewan, was attached as dental officer from the Dental Corps.

Capt. J. W. Jefferson, well known druggist of Regina, formerly with the Champlain Drugs, was appointed as Quartermaster.

Capt. H. P. H. Jones, not a medical officer, of the North Battleford district was appointed the unit paymaster.

Lieut. Ross R. Pinder, of Saskatoon, son of R. M. Pinder, M.L.A. of that city, was appointed dispenser.

The attached padres all hail from eastern Canada as follows: H/Capt. R. C. Creelman, Presbyterian; H/Capt. J. J. O'Leary, Roman Catholic; H/Capt. R. Phillips, Church of England.

The Nursing Sisters of the unit had not been posted to the unit until quite recently and from among them the Matron was selected in the person of Matron D. M. Riches whose father is Bursar of the University of Saskatchwan, Saskatoon. Practically all the rest of the fifty Nursing Sisters are from the Province of Saskatchewan as well as a vast majority of the other rank personnel of the unit.

While in M.D. No. 12 officers and other ranks of the unit operated, or assisted in the operation of,

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military hospitals in Regina, Dundurn Training Area, Shilo Camp and Winnipeg and Nanaimo Military Hospital. Personnel were also provided for travelling medical boards and training centres.

After over a year's training in M.D. No. 12 the unit as a whole moved to Debert, N.S., and was attached to Debert Military Hospital—a 500 bed hospital—to assist in its operation. It was on this movement that the majority of the Nursing Sisters were posted to this unit; the others have since joined at Debert.

Six of the medical officers, Lt.-Col. R. B. Martin, Major L. M. Fairbairn, Major F. W. Schroeder, Major E. W. Spencer, Major H. J. Spooner and Major J. B. Trudelle have preceded the unit overseas and are awaiting arrival of the others when the unit will probably function as an independent unit to operate a 600 bed hospital for which purpose the unit has been established.

The Prince Albert City and District Medical Society held a meeting on March 9th which was very well attended. The guest speaker was Dr. Frank Rosher, of Saskatoon, whose topic was "Common troubles of the prostate glands and their treatment". An interesting discussion followed.

Dr. John Valens, Saskatoon, attended the meeting and explained the arrangements for the annual meeting of the Saskatchewan Division at Jasper in conjunction with the Canadian Medical Association meeting.

There was a very live discussion regarding municipal contracts. It is one of the main topics to come up at the special meeting of the College of Physicians and Surgeons in Regina.

At the regular meeting of the Regina and District Medical Society Dr. T. Ho spoke on "Medicine in China".

Dr. Ho is an intern at the Grey Nuns' Hospital, Regina. He is a graduate of Rush Medical School, Chicago, and spent five years in Peking Union Medical College before returning to Canada.

LILLIAN A. CHASE

General

Hunterian Remains.—Last winter's raids took a heavy toll of specimens in the Royal College of Surgeons of England. The record of destruction now appears in the scientific report for the year 1940-41. Most of the specimens had been removed to the basements, which had been reinforced to receive them, but the college was exceptionally unlucky on May 10, 1941, when a heavy bomb struck the museum and store rooms, incendiaries increased the damage, fallen girders broke open the basements below and heavy rainfall on the following days drenched the exposed specimens. The losses were serious but not complete. Thus in the anatomical series (in which there were no Hunterian specimens), 1,207 survive out of 2,569. In the osteological series only 94 of 1,655 Hunterian specimens survive, and 6,209 of 15,545 college specimens. On the other hand, the whole of the odontological series—including Hunterian and college specimens—remain. Nearly half the 5,400 Hunterian physiological specimens have escaped, but only 2,026 of the 14,850 college specimens in this series. Of the human and comparative teratological series only 23 of the 170 Hunterian specimens remain, but the college specimens have largely survived. The better part of the Hunterian pathological series remains, though the college specimens have been reduced to about a fifth and the whole of the Toynbee and Strangeways collections have gone; the Army Medical War Collection, as we have mentioned elsewhere (*The Lancet*, 1941, **2**: 647) has been reduced from 3,000 to 100, and is already being replaced by modern specimens. All the mummied specimens and the historical collection are lost and the instrument collection has been reduced from 2,500 to 2,000. The zoological and anthropological pictures have survived, and so fortunately have Tonks's war pictures. The total loss of specimens amounts to 39,259 out of 65,827.

The task of salvage was a heavy though probably a grimly fascinating one for the museum staff. Specimens had to be rescued from damp, reassembled, placed in new receptacles when necessary, and transferred to safe quarters. Accommodation was found in 17 widely separated places and the American Ambulance Service kindly provided transport.—*The Lancet*, Jan. 3, 1942, p. 17.

United States

American Psychiatric Association.—A contest for the design of an emblem for the American Psychiatric Association is announced by Dr. J. K. Hall, of Richmond, Virginia, President of the Association. The emblem will be used in the centennial celebration in 1944 of the American Psychiatric Association. All artists, art teachers and students are invited to compete. Prizes amounting to a total of $500 will be awarded. Three prizes of $100 each will be awarded for the three best drawings. Inquiries concerning the general ideas of the contest, or details of the history or activities of the American Psychiatric Association, which might be helpful to the artist, are to be addressed to the chairman of the Committee on the History of Psychiatry, Dr. Gregory Zilboorg, 14 East 75th Street, New York City. Drawings should be submitted not later than April 15th.

Book Reviews

A Study of the Blood in Cancer. O. C. Gruner. 100 pp., illust. $4.00. Renouf Pub. Co., Montreal, 1942.

In this short and well illustrated monograph the author has published an acocunt of his study of blood morphology in the diagnosis of cancer. By careful qualitative and quantitative studies of the red cells, white cells and platelets he has been able to recognize certain blood patterns which are apt to occur in the blood of patients with malignant disease. Among the characteristics which, he claims, point to malignant disease are: increased blood viscosity, absence of rouleaux formation, clumping of red cells into islands with a tendency for hæmolysis to occur in the centre of the island. Significant white blood cell changes, he states, are: marked reduction in the number of small lymphocytes, abnormal contour of the nucleus of the polymorphonuclear and monocyte with the presence of mitochondria in the latter. The further claim is made that circulating tumour cells may be identified in the blood.

The author is to be congratulated on a painstaking contribution to hæmatology. However the validity of his conclusions with regard to the value to blood studies in the diagnosis of cancer should have confirmation before being accepted. As pointed out in the text further studies in this field should be carried out in the organized tumour clinics.

The Public Health Nurse in Action. M. Wales. 437 pp. $2.75. Macmillan, Toronto, 1941.

This is not a textbook but a pen picture of the public health nurse in her daily round of duties. The story is told mainly in a series of brief case histories which set forth the problem and state the action taken. This is an interesting and refreshing mode of presentation which carries with it a peculiar sense of reality. The volume will be instructive and useful for all public health workers.

The Baker Memorial. H. Emerson. 75 pp., illust. $0.50. Commonwealth Fund, New York, 1941.

The Baker Memorial Unit has an international reputation among students of medical economics who will welcome this study, by a competent observer, of its

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first decade of operation. Conceived to meet the needs of the patient of moderate means, this 284-bed experimental unit provides private, semi-private and semi-public accommodation at rates below the usual rates in Boston; medical fees are on a somewhat reduced scale and are collected by the hospital; special nurse service is discouraged and wealthy patients are not eligible. A hospital unit of its high standard is costly to maintain; the average per patient per diem cost for the decade has been $9.19, not including depreciation or interest; the average receipts have been $8.62. However, in the past few years a small but increasing surplus has been returned.

Extensive inquiry has revealed a high degree of satisfaction on the part of both patients and doctors. The doctors have not only collected 98 per cent of their accounts in contrast to their usual 60 to 80 per cent, but have been paid for much work which otherwise would have been done without charge on the wards. The author has analyzed many factors associated with the development of units of this type and concludes that such would be successful and self-supporting in centres of a quarter of a million population if the initial outlay could be contributed. The need for such a plan is not so urgent in Canada where both private room charges and doctors' fees are distinctly lower than in Boston; nevertheless the principle might well be considered in many of our larger hospitals where the care of the "white collar" patient brings up a serious economic problem.

Symptom Diagnosis. W. M. Yater. 4th ed., 900 pp. $10.00. University of Toronto Press, 1942.

This book, according to the authors, is to aid the busy physician in the diagnosis of his case, to prevent the oversight of important considerations, and to make the physician more observant of the characteristics of the symptoms of disease.

The symptoms here are presented in a very practical way for making diagnosis. They cover practically all medical and surgical conditions. First, a general consideration of the symptom is enumerated, and then the causes of the symptoms which cannot be given the name of a disease. Then a description of the diseases in the order of importance is given in which the symptom is prominent.

The contents of the book are divided into Regional Symptoms, General Symptoms, Tables of the Differential Diagnosis, and the Index.

As this book is not designed for a study, or for the library, but for the desk, and for a quick reference, it should find a reception by those who have no time for more careful study.

Teaching Preventive Medicine to Medical Students. H. R. Leavell. 77 pp. $0.25. Commonwealth Fund, New York, 1941.

This publication is a summary of Dr. Leavell's study of the experience of medical schools in the United States and Canada in the teaching of preventive medicine, with special reference to the use of health department facilities in the teaching program. Giving, as it does, current experience, the publication is of value particularly to those responsible for the teaching of preventive medicine, and also, in general, to all who are interested in medical education.

The Foot and Ankle. P. Lewin. 2nd ed., 665 pp., illust. $10.35. Macmillan, Toronto, 1941.

This is a comprehensive treatise of the textbook type in which the many aspects of foot and ankle disorders are discussed and illustrated.

An idea of the scope of the subject matter may be gained by noting that there are sections on the following aspects: Affections of Muscles, Tendons, Fasciæ and Bursæ of the Foot and Ankle; Fracture of the Bones of the Foot and Ankle; Dislocations of the Foot and Ankle Joints; Industrial, and Athletic Injuries; Military Aspects of the Foot and Ankle; Arthritis; Neurological Conditions; Poliomyelitis and Spastic Paralysis; Dermatological Conditions; Affections of the Nail; Circulatory Disturbances of the Lower Extremities; The Relation of the Foot and Ankle to General Body Mechanics.

The reader of this review can thus gain some concept of the mass of information contained in this volume which constitutes a valuable work of reference, which has reached its second edition.

Tuberculinothérapie dans les névralgies faciales idiopathiques et certaines affections essentielles. C. C. Charlin. 336 pp. Nascimento, Santiago, Chile, 1940.

Ce volume, écrit en français, par le Professeur Charlin, de la Faculté de Médecine de Santiago, est le compte-rendu des recherches de l'auteur sur la thérapeutique par la tuberculine. La première partie du volume est consacrée à la description du syndrôme du nerf nasal, décrit par l'auteur, et à sa différenciation d'avec le syndrôme du ganglion de Meckel. Déjà, à propos des névrites du nasal, l'auteur entrevait l'intervention de la toxémie tuberculeuse et guérit plusieurs cas de syndrôme du nerf nasal par la tuberculine. Ses observations le conduisirent à employer la même thérapeutique ailleurs, et la deuxième partie de l'ouvrage est consacrée essentiellement à l'étude des névralgies et névrites de la face, également accessibles à la tuberculine. Le traitement proprement dit est continué soit avec la Alt Tuberculine soit avec l'antigène méthylique de Nègre et Boquet. Seuls les malades préalablement soumis au neurologiste ont été traités; ils avaient été classés d'étiologie indémontrable. L'avis du phtisiologue fut également demandé avant de commencer tout traitement à la tuberculine, car la tuberculose ne doit pas être évolutive. En somme, la tuberculine agit comme elle agissait entre les mains de Koch chez le cobaye tuberculeux; il s'agit véritablement de bactériothérapie.

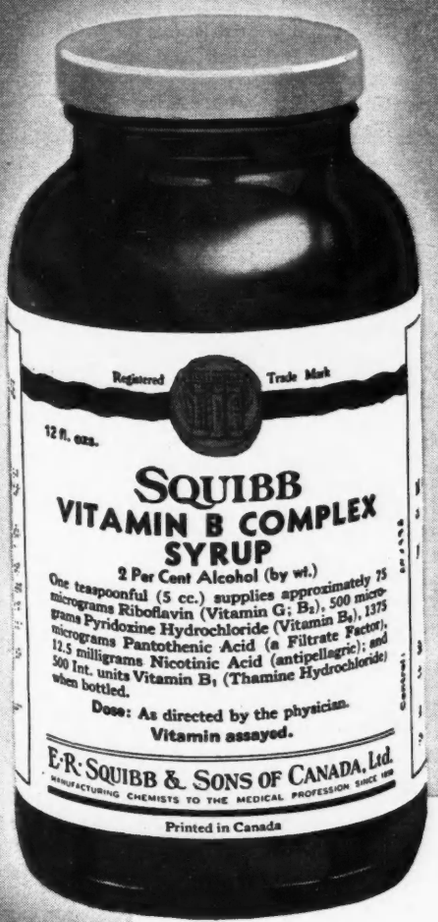
Le livre du Prof. Charlin est plus qu'un volume de spécialité. Il ouvre des horizons inattendus sur un problème de pathologie générale que la spécialisation a momentanément rejeté au second plan. Nous en recommandons la lecture, et surtout la méditation de ses belles observations à tous ceux qui aiment la Médecine. Ils y puiseront non seulement des idées nouvelles, mais aussi la stimulation que l'on trouve de plus en plus entraînante chez les médecins d'Amérique.

Exercises in Electrocardiographic Interpretation. L. N. Katz. 222 pp., illust. $5.75. Macmillan, Toronto, 1941.

This is a very welcome addition to the albums of electrocardiography. The illustrations are excellent and each is accompanied by a description and interpretation of the electrocardiogram, a brief clinical note regarding the patient, and finally a correlation of the clinical and cardiographic findings. This is not a mere book of photographs and its perusal would well repay even the highly trained electrocardiographist.

Clinical Immunology, Biotherapy and Chemotherapy in the Diagnosis, Prevention and Treatment of Disease. J. A. Kolmer and L. Tuft. 941 pp., illust. $11.50. McAinsh, Toronto, 1941.

This is a timely, practical, and comprehensive text dealing both with the basic and general field of infection, immunity and chemotherapy, along with the clinical application of this fundamental knowledge to the prevention and treatment of disease. The first third of the book deals with the general aspect, the remainder with the clinical aspect. There are thirty-six chapters of approximately one thousand pages. In addition to the subjects that one may for the sake of brevity call usual and expected, the authors have included a chapter dealing amongst others with amœbiasis, trypanosomiasis, malaria, helminth infestations and a chapter of forty pages on allergic conditions, asthma, hay fever, and dermatophytoses. Approximately one hundred pages are devoted to virus and rickettsial diseases. The chapters which deal with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virus infections provide excellent summaries, in fact the summaries generally throughout the book are novel and informative, and are one of the outstanding features of the book.

While the pendulum of opinion has swung away from belief in the value of convalescent serum in preventing the onset or progress of paralysis in poliomyelitis, the authors remain unconvinced that it is valueless. In this matter, opinions which carry such weight as theirs ought to be qualified with the statement that the development or progress of poliomyelitic paralysis is unpredictable.

In the Moloney test the dilution of toxoid is given as 1/20 whereas in the original paper the suitable dilution for the test is defined as one which in a group of sensitive individuals gives an area of redness 10 to 20 mm. in 50 per cent of such persons. In actual practice the dilution is such that in 0.1 c.c. there is approximately 1/100 Lf. Two doses of plain toxoid have been discouraged by the American Public Health Association for active immunization against diphtheria yet the authors, though not suggesting that it is the method of choice, suggest that two doses (0.5 and 1 c.c.) may suffice.

Lymphatics, Lymph and Lymphoid Tissue. C. K. Drinker and J. M. Yoffey. 406 pp. $4.00. Harvard University Press, Cambridge, 1941.

In the *Journal* for March, 1934 (p. 348), we were able to review favourably the volume Lymphatics, Lymph and Tissue Fluid written by Drinker and Field. The work now before us covers the same ground, brings the matter up to date and discusses the rôle of lymphoid tissue in the human body, a part of the subject not dealt with in the earlier volume.

The senior author widely known for his physiological researches, has been pursuing studies of the lymphatic system in collaboration with junior members of his staff, with the result that he is able to give us a comprehensive view of the physiological and clinical significance of this system. Our knowledge of the physiology of the lymphatics is far from adequate, and workers in this field and in the related clinical field will welcome this up to date presentation, issued from a laboratory which has added much to what is known of the subject. A separate section is devoted to the clinical problems involving the lymph and lymphatic vessels. It is an important volume for the physiologist, and for the teacher of clinical medicine.

Medical Guide for Flying Personnel. H. von Diringshofen. Tr. by V. E. Henderson. 102 pp. $1.00. University of Toronto Press, 1941.

This translation of a German pamphlet has been made primarily for medical officers of the Air Force, but it has material of interest to all medical men. It is a capital example of condensed information. The physiology of effects of high flights takes up more than a third of the book, followed by chapters on the effects of acceleration and of centrifugal force. The importance of the sense organs for the flier, sensory illusions in blind flying, and effects of noise and vibration are then dealt with. A final chapter deals with the important part of the medical officer in maintaining the flying fitness of fliers. There are some sound remarks here on the fundamental importance of the psychology of the flier.

The translation has been well done, and we feel that the book will appeal to many outside of the Air Force.

Electrocardiography, Including an Atlas of Electrocardiograms. L. N. Katz. 580 pp., illust. $11.50. Macmillan, Toronto, 1941.

This book may be recommended as an excellent up-to-date presentation of the subject. There are short but adequate chapters on electrocardiographic principles and the anatomy and physiology of the heart. Other sections of the book deal with the normal and abnormal cardiogram and a lot of well illustrated material is presented dealing with electrocardiograms in coronary disease. The author has come to the conclusion that as far as chest leads are concerned, CF_2 is of more value than CF_4. The illustrations he gives in support of this do not always bear out this contention. Throughout the book he states his own opinions freely and plainly and usually states his opinions therefor. The following quotation might well be taken to heart by the profession generally: "The electrocardiograph is not a tool for the unscrupulous or a plaything for the erudite, nor is it an instrument of precision which replaces the ordinary clinical examination . . . It is as much of an error to expect too much from this tool as to ignore the valuable information that it can give."

The Essentials of Occupational Diseases. J. V. Reed and A. K. Harcourt. 225 pp. $4.50. C. C. Thomas, Springfield, 1941.

These practising industrial physicians and surgeons have here given in table form a compilation from the literature and their own experience of what is known of chemical agents which cause disease in industrial workers. The authors urge that physicians working in industry have a duty to acquaint themselves with the chemistry of the materials used and of the manufacturing process followed. In this way they will avoid missing industrial diseases. The name of each harmful agent is followed by information as to the class of industry where it may be expected, the symptoms given and the treatment outlined.

Unfortunately trade names are not used. Many products will be hard to identify by their scientific names. There is also a part of the book devoted to industrial diseases due to physical agents and another to the skin lesions of occupational origin. Industrial diseases of the lungs are treated at length and the occurrence of cancer in industry studied as well as infectious diseases specific to certain industrial processes.

The book is especially timely just now with so many people employed in rapidly organized industries associated with the war. It seems to be a very complete and up to date work.

Textbook of General Surgery. W. H. Cole and R. Elman. 3rd ed., 1067 pp., illust. $8.00. University of Toronto Press, 1941.

This is the third edition of this work since it was first published in 1936. The changes have been so extensive that the book has been completely reset.

Additions have been chiefly in relation to wounds, burns, fractures and amputations. Special emphasis has been placed on the value of the sulphanilamide group, and on the importance of water and electrolyte balance.

The book constitutes a fine up-to-date volume on General Surgery, especially valuable to student, general practitioner and intern. It is also of value to the surgeon employed in medical teaching.

BOOKS RECEIVED

International Clinics. Edited by G. M. Piersol. Vol. 4, N.S. 4. 314 pp., illust. $3.00. Lippincott, Montreal, 1942.

1941 Year Book of Public Health. Edited by J. C. Geiger. 544 pp., illust. $3.00. Year Book Publishers, Chicago, 1941.

Statistical Methods for Research Workers. R. A. Fisher. 8th ed., 344 pp. 16 s. Oliver & Boyd, Edinburgh, 1941.

Business Procedures. P. R. Taylor. 109 pp. $0.25. Ed. A. Filene Good Will Fund, Inc., 31 Milk Street, Boston, 1941.

Prepayment Plans for Medical Care. F. Goldman. 60 pp. $0.25. Ed. A. Filene Good Will Fund, Inc., 1941.